

Atlantic States Marine Fisheries Commission

American Eel Management Board

October 30, 2013

9:30 a.m. – 12:00 p.m. and 1:30 – 2:30 p.m.

St. Simons Island, Georgia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

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|---|-----------|
| 1. Welcome/Call to Order (<i>T. Stockwell</i>) | 9:00 a.m. |
| 2. Board Consent | 9:00 a.m. |
| • Approval of Agenda | |
| • Approval of Proceedings of August 2013 Board meeting | |
| 3. Public Comment | 9:05 a.m. |
| 4. Update on the proposed Endangered Species Act Listing of American Eel | 9:15 a.m. |
| 5. Consider 2013 FMP Review and State Compliance (<i>K. Taylor</i>) Action | 9:25 a.m. |
| 6. Consider Harvest Permit Request in North Carolina (<i>L. Daniel</i>) Action | 9:35 a.m. |
| 7. Consider Draft Addendum IV for Public Comment (<i>K. Taylor</i>) Action | 9:50 a.m. |
| <i>Break from 12:00 – 1:30 p.m. for Captain David H. Hart Award Luncheon</i> | |
| 8. Other Business/Adjourn | 2:30 p.m. |

The meeting will be held at:
The King and Prince Beach & Golf Resort, 201 Arnold Street, St. Simons Island, GA (800) 342-0212

Atlantic States Marine Fisheries Commission

MEETING OVERVIEW

American Eel Management Board Meeting

October 30, 2013

9:30 a.m. – 12:00 p.m. and 1:30 - 2:30 p.m.

St. Simons Island, Georgia

Chair: Terry Stockwell Assumed Chairmanship: 5/12	Technical Committee Chair: Sheila Eyler (USFWS)	Law Enforcement Committee Representative: Fessenden/Marston/Hurd
Vice Chair: Tom O'Connell	Advisory Panel Chair: Martie Bouw	Previous Board Meeting: August 7, 2013

Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, VA, NC, SC, GA, FL, D.C.,
PRFC, USFWS, NMFS (19 votes)

2. Board Consent:

- Approval of Agenda
- Approval of Proceedings from August 2013 Meeting

3. Public Comment:

At the beginning of the meeting, public comment will be taken on items not on the Agenda. Individuals that wish to speak at this time must sign-up at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Board Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Update on proposed Endangered Species Act Listing of American Eel (9:15 – 9:25 a.m.)

Background

- American eel were petitioned for listing as threatened under the Endangered Species Act (ESA) in April 2010. USFWS published a positive 90 day finding on the petition in September 2011, stating that the petition may be warranted and a status review will be conducted. The organization that initially petitioned to list American eel filed a lawsuit in August 2012 against USFWS for failure to comply with the statues of the ESA, which specifies a proposed rule based on the status review be published within one year of the receipt of the petition. A Settlement Agreement has been approved by the court. It requires USFWS to publish a 12-month finding by September 30, 2015.

Presentation

- Review of proposed listing by K. Taylor

5. Consider 2013 FMP Review and State Compliance (9:25 – 9:35 a.m.) Action
Background <ul style="list-style-type: none"> • State Compliance Reports are due on September 1st (Briefing CD) • The Plan Review Team reviewed each state report and compiled the annual PRT Report and FMP Review (Supplemental Material).
Presentation <ul style="list-style-type: none"> • Overview of FMP Review Report by K. Taylor
Board actions for consideration <ul style="list-style-type: none"> • Approve 2012 FMP Review and State Compliance

6. Consider Harvest Permit Request from North Carolina (9:35 – 9:50 a.m.) Action
Background <ul style="list-style-type: none"> • The state of North Carolina has submitted a request for a glass eel harvest permit for aquaculture purposes (Supplemental Material).
Presentation <ul style="list-style-type: none"> • Review of permit request by L. Daniel
Board actions for consideration <ul style="list-style-type: none"> • Approve permit request for North Carolina

7. Draft Addendum IV for Public Comment (9:50 a.m. – 2:30 p.m.) Action
Background <ul style="list-style-type: none"> • The Board accepted the 2012 American Eel Stock Assessment for management use in May 2012. The stock assessment report found that American eel stocks were depleted. The Board initiated the development of Draft Addendum III in August 2012 with the goal of reducing mortality on all life stages of American eel. At the May Board meeting the Board delayed final action on the addendum so that a Working Group comprised of Commissioners and the TC and AP Chairs could further develop management options for consideration by the Board. • In August the Board approved Addendum III and initiated development of Draft Addendum IV. Given the scope of issues addressed in Draft Addendum III and the wide range of input received through public comment, the Board decided to divide the issues between the two addenda, with Draft Addendum IV primarily focusing on management measures for the glass eel fishery, the silver eel fishery in the Delaware River (NY), and any other measures as necessary (Supplemental Material).
Presentation <ul style="list-style-type: none"> • Overview of Draft Addendum IV for public comment by K. Taylor
Board actions for consideration <ul style="list-style-type: none"> • Approve Draft Addendum IV for public comment.

8. Other Business/ Adjourn

**DRAFT PROCEEDINGS OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
AMERICAN EEL MANAGEMENT BOARD**

**Crowne Plaza Hotel Old Town
Alexandria, Virginia
August 6, 2013**

These minutes are draft and subject to approval by the American Eel Management Board.
The Board will review the minutes during its next meeting.

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Adjournment 60

INDEX OF MOTIONS

1. **Approval of Agenda by Consent** (Page 1).
2. **Approval of Proceedings of May, 2013** by Consent (Page 1).
3. **Move to initiate Addendum IV to develop the four new working group recommendations; the potential new glass eel fisheries, the glass eel quota management options, the yellow eel quota management options and the yellow eel limited entry** (Page 31). Motion by Terry Stockwell; second by Pat Augustine. Motion carried (Page 37).
Move to substitute to remove Section 4.1.1, the glass eel fishery, from Addendum III and task staff to prepare a new addendum including but not limited to the following: Issue one, coast-wide glass eel quota; Issue two, outline adequate monitoring requirement; Issue three; outline adequate enforcement measures and penalties; Issue four, transferability; Issue five, timely reporting (Page 32). Motion by Ritchie White; second by Louis Daniel. Motion carried as the main motion (Page 37).
4. **Move to amend the substitute motion to strike “of 5,300 pounds allocated equally between all states”** (Page 34). Motion by Steve Train; second by Dave Simpson. Motion carried (Page 37).
5. **Move to adopt for the yellow eel fisheries under Section 4.1.2 for Option 2 increasing minimum size to 9 inches, for Option 3b one-half inch by one-half inch minimum mesh size, and for Option 5 trip level reporting requirements** (Page 38). Motion by Doug Grout; second by Bill McElroy. Motion carried.
6. **Move to amend to remove Option 5 for trip level reporting requirements** (Page 39). Motion by Adam Nowalsky; second by James Gilmore. Motion was defeated (Page 40).
7. **Move to amend to add a 5 percent tolerance to the minimum size limit by number** (Page 44). Motion by Pat Augustine; second by Steve Train. Motion was defeated (Page 46).
8. **Motion to have a three- year phase-in period for the minimum mesh size in which a four-inch square one-half inch by one-half inch mesh escape panel could be utilized** (Page 46). Motion by Adam Nowalsky; second by Jim Gilmore. Motion carried (Page 47).
9. **Motion to adopt under Section 4.2, recreational fisheries, Options 2, the 25 fish per day angler creel limit; and Option 3, the exemption for party/charterboats** (Page 47). Motion by Doug Grout; second by Bill Adler
10. **Motion to amend to strike the Option 3, an exemption for party and charterboats** (Page 48). Motion by Dave Simpson; second by Steve Train. Motion was defeated (Page 48).
11. **Motion to amend that the size limit for the recreational fishery matches the size limit for the commercial fishery** (Page 49). Motion by Mitchell Feigenbaum; second by Pat Augustine.
12. **Main motion now reads move to adopt under Section 4.2 recreational fisheries Option 2, 25 fish per day creel limit; and Option 3, an exemption for party and charterboats; and the size limit for the recreational fishery matches the size limit for the commercial fishery.** Motion carried (Page 49).

13. **Motion for Section 4.1.3 for silver eels fisheries adopt Option 2, seasonal closure restrictions** (Page 49). Motion by Doug Grout; second by Bill McElroy.
14. **Motion to amend for Section 4.1.3 for silver eel fisheries, to adopt Option 2, season closure; but exempt the Delaware River Weir Fishery in New York; and to allow for spearfishing gear** (Page 50). Motion by Jim Gilmore; second by Paul Diodati. Motion was defeated (Page 52).
15. **Move to substitute for further consideration of silver eel fisheries into Addendum IV** (Page 53). Motion by Terry Stockwell; second by Jim Gilmore. Motion was defeated (Page 54).
16. **Motion to amend to include an exemption for spear fishing** (Page 54). Motion by Mitchell Feigenbaum; second by Paul Diodati. Motion carried (Page 55).
17. **Main motion now reads move for Section 4.1.3 for silver eel fisheries, adopt Option 2, seasonal closure, with the exemption of spearfishing.** Motion carried (Page 55).
18. **Motion to adopt the working group recommendation on Option 5, pigmented eel tolerance** (Page 55). Motion by Mitchell Feigenbaum; second by Terry Stockwell. Motion carried (Page 56).
19. **Motion for approval of Addendum III as modified today with an implementation date of January 1, 2014** (Page 56). Motion by Doug Grout; second by Bill McElroy.
20. **Motion to amend to include a one-year exemption to the implementation date for the 2014 New York Delaware Silver Eel Weir Fishery** (Page 57). Motion by Adam Nowalsky; second by Malcolm Rhodes. Motion carried (Page 58).
21. **Main motion now reads motion to approve Addendum III as modified today with the implementation date of January 1, 2014, with a one-year exemption for the New York Delaware River fishery.** Motion carried (Page 58).
22. **Move to add to Addendum IV consideration of the New York Delaware River Silver Eel Weir Fishery** (Page 58). Motion by Jim Gilmore; second by Adam Nowalsky. Motion carried (Page 58).
23. **Adjournment** by Consent (Page 60).

ATTENDANCE

Board Members

Terry Stockwell, ME, proxy for P. Keliher (AA)	Loren Lustig, PA (GA)
Steve Train, ME, (GA)	Mitchell Feigenbaum, PA, proxy for Rep. Vereb (LA)
Rep. Walter Kumiega, ME (LA)	Roy Miller, DE (GA)
Doug Grout, NH (AA)	David Saveikis, DE (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)	John Clark, DE, Administrative proxy
G. Ritchie White, NH (GA)	Bernie Pankowski, DE, proxy for Sen. Venables (LA)
Paul Diodati, MA (AA)	Russell Dize, MD, proxy for Sen. R. Colburn (LA)
William Adler, MA (GA)	Thomas O'Connell, MD (AA)
Rep. Sarah Peake, MA (LA)	Bill Goldsborough, MD (GA)
Mark Gibson, RI, proxy for R. Ballou (AA)	Rob O'Reilly, VA, proxy for J. Travelstead (AA)
Rick Bellavance, RI, proxy for Sen. Sosnowski (LA)	Catherine Davenport, VA (GA)
Bill McElroy, RI (GA)	Louis Daniel, NC (AA)
Rep. Craig Miner, CT (LA)	Bill Cole, NC (GA)
David Simpson, CT (AA)	Sen. Ronnie Cromer, SC (LA)
Lance Stewart, CT (GA)	Ross Self, SC, proxy for R. Boyles, Jr. (AA)
James Gilmore, NY (AA)	Malcolm Rhodes, SC (GA)
Pat Augustine, NY (GA)	Spud Woodward, GA (AA)
Anthony Rios, NY, proxy for Sen. Boyle (LA)	Patrick Geer, Administrative proxy
Russ Allen, NJ, proxy for D. Chanda (AA)	Jim Estes, FL, proxy for J. McCawley (AA)
Tom Fote, NJ (GA)	Derek Orner, NMFS
Adam Nowalsky, NJ, proxy for Asm. Albano (LA)	Bill Archambault, USFWS
Leroy Young, PA, proxy for J. Arway (AA)	Martin Gary, PRFC

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Joe Fessenden, Law Enforcement Committee Rep.	Marty Bouw, Advisory Panel Chair
Brad Chase, Technical Committee Chair	

Staff

Robert Beal	Kate Taylor
Toni Kerns	

Guests

Wilson Laney, USFWS	Jeffrey Pierce, Maine Elver Fishermen Assn.
Charles Lynch, NOAA	Darryl Young, MEFA
Michael Eastman, NH F&G - LE	Amanda Poland, MEFA
Taylor Daley, DNREC	Greg Blasler, MEFA
Drew Walterhouse, Kleinschmidt Assoc.	Raymond Kane, CHOIR
Fritz Rohde, NMFS	Benson Chiles, Chiles Consulting
James Trossback, PRFC	Bill Legg, ASMFC Am. Eel AP, Grayson, MD
Kevin Miller, Portland Press Herald	Aaron Kornbluth, PEW Trusts

The American Eel Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel Old Town, Alexandria, Virginia, August 7, 2013, and was called to order at 8:00 a.m. by Chairman Terry Stockwell.

CALL TO ORDER

CHAIRMAN TERRY STOCKWELL: Good morning, everyone. I'm Terry Stockwell, the Chair of the American Eel Board; and we've got a long morning ahead of us. I just want to lay out the game plan. As you all know, the Executive Director chaired most of the last meeting, convened the working group, and the working group met multiple times during June and July to develop recommendations for this board meeting.

Kate has got several presentations. We're going to go through all of those and take any of your questions, take a coffee break, and then I am going to turn the meeting over to Bob as we consider the working group draft management options and recommendations.

APPROVAL OF AGENDA

CHAIRMAN STOCKWELL: With that being said, are there any additions to today's agenda? Seeing none; I will consider the agenda approved.

APPROVAL OF PROCEEDINGS

Has everybody had a chance to review the proceedings of the May board meeting?

MR. DENNIS ABBOTT: On the index of motions, it says that the motion that you made was seconded by Mr. Clark. It said the motion carried; move that the following measures be approved for the commercial glass eel fishery; participating states must conduct a complete life cycle survey within three years, et cetera and et cetera.

I don't recall a vote, number one, and I think we had agreement on Page 37. Mr. Diodati suggested that he withdraw our motion and you withdraw your motion. I don't see that we took any specific action other than the Executive

Director saying everybody seemed to nod in agreement. I think that is an error on Number 5; the motion that you made.

CHAIRMAN STOCKWELL: Yes, thank you, Dennis, I agree with that. I didn't formally withdraw the motion, because the board's discussion took a life of its own, but you are absolutely correct.

MR. ABBOT: But the motion did not carry.

CHAIRMAN STOCKWELL: That is correct. The amended minutes will reflect that. Are there any other comments on the proceedings? Seeing none; consider them approved.

PUBLIC COMMENT

I have one person who has signed up to speak to the board on issues not on the agenda today. Is there anybody else from the public who would like to speak? If not, Rick, if you could come forward; please identify yourself to the board.

MR. RICK ALLEN: Good morning. My name is Rick Allen from the American Eel Farm; and I'm here to speak about aquaculture. I would like to refer to comments made in the April 2000 Fishery Management Report Number 36 of the Atlantic States Marine Fishery Commission. It states on Page 19, "New York, Rhode Island, Delaware, Maryland, PRFC, and North Carolina have only recently; '92 through '95, imposed a minimum limit of 15 centimeters so as to protect elvers and glass eels for local aquaculture development."

This being the case, it clearly seems that the intent of the state of North Carolina and ASMFC at the time was to allow and provide for the development of local aquaculture facilities to grow out the elvers and glass eels. At this time, American Eel Farm is an existing 2 million dollar facility that is the only permitted facility in the U.S. specifically for the grow out and development of the American eel.

We need a harvester's permit to do so. In addition to those comments, there was this intent by the board to allow for aquaculture or to

support aquaculture was confirmed in May by Mr. Stewart. His comments were; "I just thought a recount history a little bit, I was the first Chairman of the Eel Board when the Eel Board was first created.

"Before that I was in academia, and had designed a clearinghouse for glass eel fisheries. That had come to me underground, so to speak, at the time that was supported by a lot of Asian money. We have the idea and the concept to support the Taiwanese and Japanese to have a grow-out facility in the state of Connecticut, which would then export one kilogram. Anyway, just a point of business and comment for all the states that could still be a possibility. "Not just the glass eel fish that you sell for a dollar in a barrel to the Asian market, but to develop some sort of grow-out aquaculture industry."

We have an existing farm with the intentions to use our farm as a means to support sustainability through aquaculture and also by returning a percentage of our grow-out back to the wild. Aquaculture also provides a sound, ethical choice for food and nutrition, security and human well being; and now is the ideal time while the fishery is stable.

I would just like to make a quote here from the Food and Agricultural Organization of the United Nations. "Aquaculture is currently playing and will continue to play a big part in boosting global fish production and in meeting rising demand for fishery products. A recent session of the FAO Committee on Fisheries stressed an increasingly important and complementary role of aquaculture." Thank you for your time and I would be here for any questions if you need me.

CHAIRMAN STOCKWELL: Before we move on to Kate, I will turn it over to Bob for a minute.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Since this is the first coast-wide board that met during the meeting, I want to introduce two new folks that are sitting around the table. Anthony Rios from New York is serving as a proxy for

Senator Philip Boyle from New York. Marty Gary is the new Executive Secretary for the Potomac River Fisheries Commission. A few new faces at the table and I wanted to make sure everyone knew where they were from and then take time to introduce yourself during the breaks.

CHAIRMAN STOCKWELL: Thanks, Bob, and welcome. Kate, it's all over to you now.

DRAFT ADDENDUM III TO THE AMERICAN EEL FMP

MS. KATE TAYLOR: I will be reviewing the management options that were under consideration in Draft Addendum III that the working group began with, and then I'll also be going through the working group recommendations that were developed between now and the May meeting.

REVIEW OF MANAGEMENT OPTIONS

As you can recall, our current fisheries management plan was adopted in 1999 and set recreational and commercial management measures for all the states for their glass, yellow and silver eel fisheries. Last year the board was presented the 2012 benchmark stock assessment, which was accepted for management use.

American eel; the stock status was declared depleted due to habitat loss, passage mortality, disease and shifting oceanographic conditions as well as fishing mortality. Draft Addendum III was initiated in response to the stock assessment. This addendum contained habitat recommendations, monitoring requirements and also proposed changes to the commercial and recreational fisheries.

The goal of the addendum was to reduce mortality on all life stages. It was proposing coast-wide regulations and the options could be implemented in combination. As I mentioned, there were habitat recommendations contained in the document to help improve our understanding of how American eels are using the habitat, as well as to increase or improve

upstream and downstream passage and habitat restoration.

The addendum also proposed a number of fisheries-independent and dependent surveys to aid in data collection for use in management as well as future stock assessments. Under the draft commercial management options, there were proposed measures for glass, yellow and silver eel fisheries.

Under the commercial glass eel management measures, for Maine and South Carolina only options included Option 1, the status quo; Option 2, a closure of the glass eel fishery; either immediate or a delayed closure. Option 3 was a quota based on the historical average of landings from the 1998 through 2012 time period. Then there were also options for harvest reductions from this time period of 25 and 50 percent.

The draft addendum contains tables and this graph for both Maine and South Carolina, showing what those quota allocations would look like. Additionally, under proposed glass eel measures was an option for increasing dealer and harvester restrictions, as well as an option for a pigmented eel tolerance where only a small tolerance of pigmented eels would be allowed to be harvested.

This was in response to concerns about the development of the pigmented eel fishery, given the price for glass eels. Under the yellow eel management measures, the proposed options included Option 1, the status quo; Option 2, an increase in the minimum size of yellow eels harvested with a range of 8 to 12 given.

Tables in the document show what the impacts would be for those states we had data for in their fisheries, as well as the potential increase in eggs per recruit that the increase in minimum size would also be associated with. The additional options included gear restrictions; specifically a three-quarters by half-inch minimum mesh size or escape panel or a one by half inch minimum mesh size or escape panel. There was also an option for a coast-wide yellow eel quota. Again, this was based on a few different options for

allocation based on landings from a few different years, as well as restrictions from those base years.

The first option was to use the landings from 1998 to 2011. The second option was 1999 to 2011. The third option was 2002 to 2011. Additionally, there was, similar to the glass eel measures, an option for increasing reporting requirements. There was also an option for a two-week fall closure for the yellow eel fishery, which would apply only to the pot and trap fishery. That would take place between September 1st and October 31st, and it would be for two consecutive weeks; although states could specify when the closure would occur.

There is a table in the document that contains the impacts that this closure could potentially have, although the table is by month, and so you would have to half those values. Under the silver eel management measures, the options include Option 1, the status quo. Option 2 would be gear restrictions; specifically no take of eels from the fall from any gear type other than baited pots or traps. The recommended timeframe for this by the PDT was September 1st to December 31st.

There was a table in the document which shows the out-migration of American eels from rivers along the coast where that information is known, as well as the associated harvest by month to show the impact of this measure. The draft addendum also contained options for the recreational fishery. Option 1 was the status quo, which would be the current bag limit of 50 fish per day.

Option 2 was to reduce the recreational bag limit to 25 fish per day per angler. Option 3 was an allowance for the party and charterboat exemption; that if Option 2 was chosen, the board could consider this option and would maintain a current 50 fish per day limit that party and charterboats now have, and that is per crew member. Thank you, Mr. Chairman.

CHAIRMAN STOCKWELL: Are there any questions for Kate? Okay, moving on to the working group recommendations.

**REVIEW OF WORKING GROUP
RECOMMENDATIONS**

MS. TAYLOR: As I just mentioned, Draft Addendum III was initiated back in August in response to the findings of the American eel stock assessment, which found the status of the stock to be depleted. The board initially reviewed a draft of this addendum in October, provided additional guidance to the PDT and then approved this document for public comment in February.

This draft addendum was out for public comment in April and May. The board reviewed the public comment at the May meeting, at which time the board appointed a working group of commissioners, AP members and technical committee members to develop potential recommendations on moving forward with the finalization of Addendum III.

This working group met multiple times in June and July to review the management options that were contained in Draft Addendum III. The working group presents the following recommendations to the management board for their consideration. Under the monitoring and habitat sections, the working group supports these requirements and recommendations as contained in Draft Addendum III. The general recommendation was that the working group unanimously did not support Option 1, the status quo, for both the commercial and recreational fishery management measures.

Under the commercial glass eel management measures, the working group discussed the option for a closure. The working group does not support this option as the stock assessment found no stock-recruitment relationship; as well as the working group recognizes the economic importance of the fishery in those states that currently allow harvest.

Under the option for a quota for the glass eel fishery; the working group does not support any of the quota options that were initially included in the draft for public comment. The working group did discuss the option of a quota based on more recent landings, as well as the potential to

transfer quota from the yellow eel fishery to the glass eel fishery.

The working group was interested in some modification of the options that were additionally contained in the public comment documents. I will discuss those later on in the presentation. Under the increased reporting requirement that was contained in the public comment document, the working group did support increased commercial fishery monitoring, especially if a quota-based system was implemented to aid in management.

The working group also supported the monthly reporting requirements following the ACCSP standards. Under the requirement for a pigmented eel tolerance for the glass eel fishery, the working group supported this tolerance as well as any restrictions on harvest at this life stage. This would be applied to any state that has a glass eel fishery current or future.

The working group recommended that this could be accomplished through the use of a one-eighth inch non-stretchable mesh, which was also the recommendation of the advisory panel. The AP also recommended a 1 percent tolerance by count to this requirement. Under the commercial yellow eel measures, the working group looked at the options.

Again, did not support the status quo, Option 1; for the Option 2, increase in minimum size, the working group supported a minimum size of nine inches. They supported the recommendations of the LEC that it would be difficult to enforce a minimum size regulation without the use of complementary gear restrictions.

Therefore, the working group also recommends that if a minimum size is implemented, it be in conjunction with gear restrictions. For this gear restriction, Option 3 contained in the draft addendum, the working group discussed the proposed gear restrictions, including a new option for a half by half inch mesh requirement or escape panel.

Currently there are several states that have at least half by half inch mesh requirements in place with the exception of New Hampshire, Massachusetts, Rhode Island, Connecticut, Delaware and New Jersey. A half by half inch mesh requirement would cull eels approximately less than eight and three-quarters inches.

The working group recommended a half by half inch mesh requirement through the use of an escape panel for a specified time, for example, three years or another timeframe specified by the board. After this time, the gear would have to be phased out. The working group recommended that states and jurisdictions that currently have more conservative measures than half by half inch mesh requirements be required to maintain these gear restrictions. This option was also supported by the advisory panel.

If a half by half inch mesh restriction is implemented with a nine inch minimum size, the board may have to consider a tolerance for undersized eels since there is the potential for – the analysis shows that it is eight and three-quarters inch eels correspond to half by half inch mesh. Additionally, there were comments that were brought up that sometimes eels are also kept by the harvesters or the dealers.

Another point would be the board needs to consider the point of enforcement if eels are retained and they lose their size and they fall below those requirements. For the coast-wide quota, Option 4, the working group was supportive of quota management for the fishery based on recent landings.

This aligns with the recommendations of the Stock Assessment Subcommittee as it was considered the most effective way to ensure a reduction in mortality. The working group however was not supportive of the base years that were presented at the public comment document or the method for allocating quota to the states and was interested in some modifications to the options, which I will discuss later on in the presentation.

The working group was supportive of the increased reporting requirements under Option

5, consistent with the glass eel fishery, and especially if a quota-based management program was implemented. Additionally, the working group supported the monthly reporting following ACCSP standards. The working group was not supportive of the two-week fall closure.

Under the commercial silver eel management measures, the working group unanimously supported Option 2 with some modifications. The working group noted the cultural value and economic support to the community provided by the silver eel fishery along the Delaware River and its tributaries. However, the goal of the addendum is to reduce mortality on all life stages. An increasing survival of silver eels provides the greatest chance for increasing spawning success.

The working group recommends prohibiting the harvest of American eels from gears other than pots, traps and spears from September 1st to December 31st, with the exception of New York commercially licensed weir fishermen in the Delaware River and its tributaries from September 1st through December 31st.

The working group recommends that New York must reduce active effort, so not through latent effort removal, by an amount specified by the management board. The effort reduction plan must be submitted to the technical committee for review and approved by the board no later than a date specified by the board. The goal here would be to have the fishery phased out within ten years or some other timeframe specified by the board.

Additionally, the board may want to consider silver eel monitoring requirements similar to the requirements for the potential allowance for the glass eel fisheries, as I will discuss later. Under the recreational fisheries management measure, the working group unanimously supported Option 2, the 25 fish per day bag limit; as well as Option 3, the exemption for the party and charterboats.

The working group was supportive of also having the same minimum size for both the commercial and the recreational fisheries. The

working group recommends the finalization of Addendum III as recommended to allow for the potential implementation of management measures prior to the start of the 2014 fishing season. The working group recommends the immediate initiation of Draft Addendum IV, which would include measures from Draft Addendum III that have been further refined based on the public and board input, as well as the new measures developed by the working group and the stock assessment subcommittee.

Those new measures which were contained in the memo; I will go through those right now. The initial proposed goal for Draft Addendum IV would be to reduce overall mortality on American eels. This document could be made available for the board's review in October with final approval at the February 2014 meeting.

Draft Addendum IV may include some of the following measures. Under a proposed commercial glass eel fishery, the working group discussed the possibility of allowing the development of glass eel fisheries in states where harvest is currently prohibited. The working group recognizes that the Stock Assessment Subcommittee emphatically does not support the development of additional glass eel fisheries due to the uncertainty in the stock-recruitment relationship and the natural mortality estimates, as well as the concern that poaching could have on the health of the stock.

However, the working group discussed that if two states are allowed to continue to operate a glass eel fishery, the remainder of the states should be given this same opportunity provided certain restrictions and requirements are met. Inherent in this is that there will be a reduction in the mortality on eels even if there is an increase in the number of states participating in the glass eel fishery.

Additionally, the associated survey requirements may provide much needed data on the stock for use in future assessments. Under the glass eel fisheries requirements, four states that could open up a glass eel fishery would be required to do the following measures. There would be a reduction in mortality in the yellow eel fishery

potentially through the transfer of yellow eel landings into a glass eel quota. This would require that the states have implemented a yellow eel quota.

For states that have limited landings due to declining efforts or interest in the fishery, they could be granted a limited glass eel fishery not to exceed a specified amount as determined by the board. There could also be a requirement to reduce mortality or increase survival on other life stages for states wishing to opt into that.

Additionally, for states looking to open up a glass eel survey, the working group recommends the completion of a full life cycle survey in at least one watershed for at least three years. This would be implemented prior to or during the start of the first open glass eel fishing season. Allocation could be revisited after three years or another timeframe specified which aligns with the collection of the data in the life cycle survey.

The working group recommends for those states or jurisdictions looking to open up a fishery that they need to have adequate penalties to discourage poaching, adequate enforcement to monitor poaching, timely commercial monitoring to ensure that the quota is not exceeded, the ability to close the fishery when landings reach a specified threshold as determined by the board and as well as implementation of the pigmented eel tolerance. The implementation program would be subject to technical committee, LEC and/or AP review. The quota for states that currently have a glass eel fishery; the working group recommends the options in Draft Addendum IV to include quota allocations based on the average landings from the following periods: 1998 to 2012, 1998 to 2010, 2010 to 2012, or 2007 to 2012.

The working group also considered inclusion of a percent reduction from one of these timeframes or another amount specified by the board. Additionally, for those states that would continue their glass eel fishery, the working group recommends the inclusion in Draft Addendum IV of the requirement for a completion of a full life cycle survey; looking at a timeframe for revisiting of allocation.

Additionally, those states need to ensure that adequate penalties and enforcements are in place to monitor poaching; that timely commercial monitoring is allowed so that quota would not be exceeded.

The states would also have the ability to close the fishery when landings reach a specific threshold and also would include the pigmented eel tolerance with the implementation program subject to committee review. That was the proposed measures for states that currently have a glass eel fishery.

Under the Proposed Draft Addendum IV commercial yellow eel management measures; the working group was supportive of quota management for the yellow eel fishery, but recommended the use of a new approach in determining allocation and in setting the quota to be contained in Draft Addendum IV.

Specifically, the working group recommended that the proposed measures included in the documents; that the allocation be based on the average of the three highest landing values from 2002 to 2012, and that the total coast-wide quota – so that would be the three highest landing values for each states and that is then summed and then that percentage is then divided up amongst the states; and that the total coast-wide quota be based on a base year landings from 1998 to 2012, 1998 to 2010, 2010 to 2012, or 2007 to 2012.

Additionally, options could also include a percent reduction from one of the above amounts or another amount specified by the board. The table contained in the memo shows the percent allocation to each state based on their three highest landings from the years 2002 to 2012. Then it shows the four different options that were available to show based on landings from the following year schemes.

The working group recommends that if this option is included in the document, that its quota is revisited after three years or another timeframe as specified by the board. The working group also recommends a 2,000 pound minimum for those states that have small

fisheries to reduce the administrative burden of monitoring. This quota however could not be used for a glass eel conversion.

If a state exceeded its allocation and the total coast-wide quota was also exceeded, that state could be required to implement management changes in the following year to reduce harvest. If the total coast-wide quota was exceeded, then those states or jurisdictions that exceeded their allocation would be required to pay back their quota in the following year in one of the following ways. Either the state or jurisdiction would be deducted equal to the amount of the overage that occurred in the states or jurisdiction for the following year, as occurs in many of the commission- managed species.

Additionally, there would be an option that the states or jurisdictions that exceeded the quota would have their quota deducted in the following year in proportion to the quota overage, which is similar to black sea bass. There could also be another proposed method as specified by the board to be contained in the Draft Addendum IV document.

There is a table in the memo that just gives an example on how the overages could be potentially deducted in the subsequent years. If during the fishing year a state or jurisdiction exceeded its allocations, then that state would be required to implement measures to close its yellow eel fisheries for the remainder of the year when the landings reach a specified threshold as determined by the board.

Additionally, the working group recommends for inclusion in Draft Addendum IV that if a state chose to allow a glass eel harvest, then the state would have its yellow eel quota reduced by the required amount, which is similar to the recommendation I made under the proposed glass eel management options.

The implementation of the quota system within a state's waters would be determined by the state, so the state would have the flexibility for implementing the system. The working group did not have any recommendations at this time to be contained in the draft addendum on how

that implementation would occur. Again, the quota allocation could be revisited after a timeframe specified by the board.

The working group also did discuss the implementation of a limited entry program for the yellow eel fishery, but thought that it would not be necessary if quota management was implemented, but they did discuss this as an option to be contained in the document. However, there would be a few states that this would be an administrative burden to them. Under this option, states would be required to reduce latency in limited entry into the fishery. That concludes my presentation on the working group recommendations. Thank you, Mr. Chairman.

CHAIRMAN STOCKWELL: Thank you, Kate, for a very succinct report. Questions? Roy.

MR. ROY MILLER: Thank you, Mr. Chair, and thank you, Kate, for the excellent report. I have a question concerning specifically the portion of the recommendations regarding the potential for opening glass eel fisheries provided there is a concurrent reduction in the yellow eel fishery in the state.

Kate, for a data-poor species, which this is acknowledged to be, I am wondering in my mind how that might be calculated. Do you have any preliminary thoughts as to what types of data would be needed to conduct those particular calculations of substituting glass eel harvest for yellow eel harvest?

MS. TAYLOR: The Stock Assessment Subcommittee did weigh in on this, and Brad will get into it in a minute with his presentation. The technical committee did weigh in on the life cycle survey; and the Stock Assessment Committee gave recommendations for the specific information that they would want included to help aid in future stock assessments, as well as the potential to calculate these estimates with greater certainty in the future. It is age of entry into the fishery, mortality of glass and yellow eels, age structure and average length and weight of eels in the fishery, as well

as any other additional information states wanted to add in.

MR. JAMES GILMORE: That was a great presentation, Kate, because when I was reading this stuff last night, it was getting foggy, but that cleared up a lot of questions I had. Just two starters first, the data we have to essentially decide quota distribution, I am just wondering how good the data is that we are running into another menhaden issues where we suddenly are going to divide this thing up based upon inadequate landings.

How confident are we; and do we have the same problem that we have with we just have unreported landings, so we're going to divide that up. Secondly, I'll throw this question out, because it is more of a rhetorical question. Can we actually define what adequate enforcement and penalties are?

We could talk about that for the rest of our lives; and unless there is some outside body like – I run the shellfish program; so we have the feds come in and they tell us what adequate enforcement is. But it is one of those ones that and you don't have to answer this, but I am not sure how we would define that; But if you could answer the first one, thanks.

MS. TAYLOR: I can definitely answer the first one. The second one would be up to the board. For the landings, the quota allocations; the landings that were used were from the stock assessments, the 2002 to 2012 base year. As you know, the stock assessment contained data really only through 2010. We did have some 2011 landings that we did look at. To supplement for the additional 2011 landings and the 2012 landings, we used data either provided by the state or by ACCSP. We're fairly confident in those numbers.

MR. ADAM NOWALSKY: One of the sections of the addendum was habitat recommendations, and I see that the working group did make the general comment that they support the monitoring requirements and habitat recommendations; but was there any discussion about the viability of actually being able to

achieve any of these habitat recommendations in a realistic timeframe?

Specifically, we go back to the benchmark stock assessment where it talks about current levels of fishing effort may be too high given the additional stressors. We could just as easily substitute that current levels of habitat loss may be too high.

We've got all these other factors affecting the mortality; we're only here talking about fishing mortality specifically. We have an addendum that contemplates ways to deal with a lot of this habitat loss and habitat recommendations, but what can we actually do? What did the working group talk about the viability of achieving these, if at all?

MS. TAYLOR: The working group reviewed the habitat recommendations. These were developed with the PDT and Technical committee input; and it based on the recommendations from the stock assessment. These recommendations provide a guide, hopefully, that the technical committee can work amongst the committee within their states and with the board to meet all of the items that are contained under there. But since they were just recommendations, there wasn't further deliberation past that.

MR. NOWALSKY: What would be the next steps to take them beyond recommendations then and actually to implement some of these?

MS. TAYLOR: That would certainly – with the recommendations contained in the document, there are recommendations to the states to implement these as they can with the assistance of the Technical committee or other ASMFC committees as available.

MR. ABBOTT: My first question was going to be the same as Mr. Miller had about how we determine the value of yellow eels versus a number of glass eels; but beyond that, let me say that when I left the last meeting, it was my understanding and I thought that the working group was going to focus on the glass eel issue.

That is where we were in the debate. We were talking about the problems that we were having coming up with either a moratorium on one side and an open fishery on the other. We talked back and forth. I do appreciate the work that the working group did. It obviously was a lot of work to provide us with the things that they did; all the recommendations.

But I don't see enough information there concerning glass eels, which I thought was going to be the focus, and the task was to be able to provide us with additional options about glass eels. I think we know that we are all in this room essentially today to be dealing with the glass eel situation. I am not sure that we're dealing with that.

What we did is we created a working group who suddenly conducted the equivalent of public hearings and whatever and came up with their own determination, which part of that should be the work of the complete board and part of it should be the public offering input. I didn't expect them to say that they wanted to close this or that or whatever the options would be.

I think that is this board's decision, and not a group comprised of seven commissioners and people from the Services and the technical committee and the AP chairs. A gain, I appreciate the work that they did, but I don't think that we achieve – unless I'm getting it wrong, that we achieved what we think that we asked them to do back at the May meeting. Am I wrong in that assessment, Mr. Chair?

MS. TAYLOR: The options contained in the memo are just recommendations for the board's consideration. The working group did meet many times in June and July, and they had specific calls just for the commercial fishery, just for the glass eel fishery; and while it might have been the thought to only focus on the glass eel fishery, given that it is the same species and when they were discussing the specifics for the glass eel measures, they realized that so much of this was woven into the yellow and the silver eel fisheries as well; so to kind of look at it as a more holistic approach, included measures for all life stages.

MR. ABBOTT: Just let me repeat that I have no intention of denigrating the work of the working group, but I just expected more meat when it came to the glass eel fishery than what I think I'm seeing. Maybe I'm the only one.

CHAIRMAN STOCKWELL: If you could resolve that issue for us today, we would appreciate it. Just to cycle back to Kate's explanatory, the working group is charged to develop recommendations for all life stages and to come back to today's board meeting so that we can move forward with a final action on Addendum III.

These are our recommendations for the board. Approval or disapproval, certainly there are some measures that if the board approves, they are going to have to go out for public hearing. I think that is where we'll be going at the next stages of this morning's discussion. I've got quite a few hands coming up right now.

MR. ROB O'REILLY: Thank you, Mr. Chairman, and thank you for the report, Kate. To start off with just a couple things about the report; I think it is important, especially with the characterization of the data, that information is available at the base level. There is a Table 5 that is in the document from August 1 from the working group.

First, I want to fill in a couple blanks there I see for Virginia, because it is important to know about the effort in this fishery. Virginia has a combined fish pot/eel pot license. Virginia doesn't define a fish pot; and consequently if you go to buy a fish pot/eel pot license, you have to know from the data that comes in what is really being active.

Out of the 427 permits listed, 55 are active as of 2012 eel pot fishermen; those are landings from eel pot fishermen. There are three categories there which range from less than 100 to 300 plus. Twenty percent roughly, 11 of the 55 are in the 300 plus pots. I think it is good to file that information.

Latency would be a difficult thing to do. It can be done, but at this stage we haven't segregated

the fish pot landings from the eel pot landings. But I think it is going to be important as we go forward to have more information from all the states. One of those statistics is catch-per-unit effort, or catch per pot; the largest gear, perhaps.

I don't know how much of that is available. I think it is information like that that would really help to have some catch-per-unit effort information. I note from the Virginia data that except for 1997, when there was a spike up; that generally from the time mandatory reporting was started in Virginia in 1993 until the present, really, the trend is pretty much the same.

There is just a little bit of variance around that trend, relatively flat. Of course, the landings, at least since maybe the mid-nineties in Virginia also have shown a drop from about 400,000 heading in to the early nineties to about 100,000 on average the last six years. I think if we have some nominal statistics like catch-per-unit effort, it would be very good.

I did want to comment also on the glass eel. It is going to be commented on many times today, but I did think from the last meeting and from the meetings before, the question I've always had is what is the relationship or how is it being done to probe the relationship from the glass eel to the yellow eel?

In fact, there are monitoring programs which have been in effect for quite a while in several states for the glass eel. I know in Virginia the questions keep rising up as to, well, what is this really telling us? Each time I've asked the question, it has become a little bit closer to the Stock Assessment Subcommittee indicating that there is promise there. It is just not quite there yet.

On top of that and the fact that it has been stated the stock recruitment relationship; if it is there, it is not very strong, I suppose, but now you move to a slightly advanced life stage from the recruits to the glass eel. When we left off last meeting, one of the questions was would this type of mortality in the glass eel fishery be subsumed by natural mortality?

In other words, if there was not a glass eel fishery, what would the net effect be in terms of overall mortality? Would it be part of the natural mortality as was proposed quite a few years ago by Brian Jessop in Canada? I think that it needs to be discussed about the tradeoffs, trying to achieve conservation equivalency with glass eels and the yellow eels.

That should be a pretty good discussion given the backdrop of a lack of stock-recruitment or a strong in a way a lack of the glass eel to yellow eel relationship shown yet, and also this idea that perhaps are we swapping something in terms of a fishery that has existed right now in two states; would it be simply a natural mortality situation? I think that is a tough question, but I know that was a question from last time.

CHAIRMAN STOCKWELL: Yes, thanks Rob, good questions, some of which the subcommittee struggled with as well. Following all the questions on Kate's presentation, Brad is going to be making a report from the Stock Assessment Subcommittee, which is going to cover some of the issues that you have just raised. Mitchell.

MR. MITCHELL FEIGENBAUM: I just wanted to address a few of the points that have been raised. I do have a question for Kate; but starting with my last point, since it addresses what Rob was just talking about, I just would point out that the working group has continued to present the condition or not the condition but has adopted the line of thinking that says if there were to be any expansion of glass eel fisheries based on some conservation equivalent, some conversion of the yellow eels; that there would be these survey requirements.

Sometimes in some of the conversations with fellow board members, I've gotten the sense that the survey requirement seems like it is being treated as if it would be a nuisance. But, really, Brian Jessop himself would tell you – and I hope Brad will support in his presentation that ultimately to really understand the stock and the relationship between recruitment and stocks, you have to survey in order to determine what are the natural mortalities at different life stages, and

that there is going to be a lot of variability between different watersheds.

There is not going to be a one-size-fit-all formula. Brian himself has told me this; that he has studied the migration in glass eels to a particular watershed and then studied what is the yellow eel population down the road. That is how he determines what the natural mortality rates are at the different life stages. I just would emphasize that if there is any consideration of an expansion of the glass eel fishery, and if Maine is permitted and South Carolina to keep their glass eel fisheries, these survey requirements really should be taken seriously.

The second point I wanted to make was to Adam's questions about habitat. We heard yesterday and we've heard for years and years in these meetings the frustration that we all seem to feel over the fact that we don't have a whole lot of teeth in terms of dealing with habitat restoration. I just want to throw out the possibility to my fellow commissioners that here we might actually have a creative opportunity to do something meaningful in the way of habitat.

That would be to somehow, as we go forward with the plans, to consider that quotas or the opportunity to convert from one kind of fishery to another could include incentives to states that by increasing habitat they could get some additional quota. It is just something to think about. It might not be the most ideal way to encourage habitat restoration, but it might also be the only way that this group can meaningfully put a little bit of teeth behind our constant recommendations that we promote habitat restoration.

Finally, Kate, I have a question for you. As you made clear in the presentation – I echo the sentiments of those who thought it was a good presentation – you mentioned that the working group did not support the idea of cutting back on latent effort because it would create administrative difficulties in some of the states.

Also, the working group said that if we went with a quota, then any adjustments to latent effort would be unnecessary, because the quota

would be setting the cap so why bother with the limited entry. But I would also point out that many folks in the public felt and some of my fellow commissioners also have expressed to me that limited entry might be a more appropriate way of addressing the yellow eel concerns than quotas.

We also know that imposing quotas on the yellow eel fishery is also going to cause administrative concerns in the states. My question for you, Kate, is can you just explain a little bit more why it would be more difficult for states to address latent effort than it would be for them to develop statewide quotas – if in fact it would be more difficult. It seems to me the difficulty is inherent in either approach and it is just going to require hard work.

MS. TAYLOR: The removal of the latent effort doesn't really get to the goal of reducing mortality for life stages. Additionally, some of the states weighed in on the difficulties in implementing limited entry system; specifically, for example, the state of North Carolina. Their legislative system requires that the limited entry must be a federally managed species either through the counsel or the ASMFC, and it must have an allocated quota. It would be very difficult for that state to implement a limited entry program if there wasn't a quota system already in place.

MR. GILMORE: I just wanted to echo a little bit of what Dennis Abbott had said. I sort of had the same impression when I left is that the focal point of this was the glass eel fishery. Actually, after we left the last meeting, I was kind of happy because I thought I got a b ye after Marty's report about the weir fishery in the Delaware that was characterized it was so small and it was a historic fishery of little impact that essentially it could stay, whatever.

Now, I was kind of surprised when I saw the working group's recommendation that we're essentially going to phase this out. I guess the justification or at least the idea was that, well, the adults provide the greatest reproductive capacity. Yes, of course, but that is again based upon a significant harvest. If you have got an

insignificant harvest, then trying to phase something out that really isn't a big player in this didn't seem to make any sense.

It just rubbed me a little bit that I'm sitting here going; well, sure, you can make the argument that the adults are the best contributors to reproduction in terms of the overall fishery, but recruitment overfishing is equally in damaging in the long run, which is what we're doing with the glass eel fishery.

That was just a bit of a surprise to me to see that now we've got something that I thought I was done with this. Now I have to consider maybe phasing a fishery out, doing a lot of work which I don't have the staff. I am still suffering from the menhaden issue that I have to get into, Mitch, in terms of the staff I have and monitoring that.

It is a lot of work done that I don't have the resources to do. Now I am faced with instead of walking out of the room with a bye, maybe having to do a lot of monitoring and possibly developing a glass eel fishery, which just doesn't make any sense to me. This whole thing surprised the hell out of me. Thank you.

CHAIRMAN STOCKWELL: It sounds like you want to volunteer to be on the next working group.

DR. LANCE L. STEWART: Since I've been referred to in comments from the last meeting with my experience in glass eels, I thought I would refine that a little bit more. Back in the early nineties, we were very interested in S-K Proposals, fisheries development plans with the National Marine Fisheries Service.

Because of contacts that had come to me from the Asian area, because they knew I was experimentally looking at glass eels in eastern Connecticut, I submitted a proposal and they said it was an insignificant fishery. Anyway, we went from there. But I thought I would share some of the observations in about three years of doing field work quite vigorously during the times of recruitment of glass eels in eastern Connecticut.

Every stream, every small tributary has tremendous numbers of over-recruitment of glass eels. You can catch five gallons with a dip net in most streams. Now think of the survival rate. Of a fairly robust larvae or young eel going into a stream, there is tremendous over-recruitment. We've always looked at several populations, lobsters, bluefish and everything, as survival window mechanisms.

The number of young you have is limited by the carrying capacity of the stream or the habitat. This is even more significant in the eel fishery. I was strongly in favor of aquaculture. As the fellows from North Carolina are proposing today, I strongly support that because of the things that you can do.

By monitoring glass eel take or growing them to a yellow eel stage, not for bait but transplanting them, either up into inland waters, into coastal reserves, there is a tremendous management option not just to close a glass eel fishery but to utilize it. In every state up and down the seaboard into South America, into Europe has glass eel recruitment that is one of the highest it has ever been in the last two years. I think if there is any time to utilize it without jeopardizing our stocks of adults, it would be now on a very tightly controlled and watched quota.

But I think you will find if you really intensively look at what we were supposed to be doing, glass eel recruitment survey, if you took one stream and caught all the glass eels you could in a night, you would get an idea of the tremendous abundance. Those are some of the things that I don't know whether all the board members have experienced. It is hard to go out in the middle of April when it is raining in a thunderstorm and the best glass eel runs are occurring and do the science.

But from my fairly expansive exposure to that, I would say that the glass eel is viable worldwide. Because it is a panmictic population, there is no salmonid philosophy here; they don't home to a stream. You have a South American male and a Newfoundland female. The only genetic input I

can think of is the return back to the sargassum to spawn and the tendency to go to fresh water.

Those are probably the only mechanisms of a genetic driving force between panmictic species. That in itself is another survival trait; that you don't have a requirement of having a population that is very limited. Those are the few things. One observation that we made – I have one graduate student working with me – is that you would have some streams that you would predict to be very strong glass eel recruitment areas.

They weren't so, because of what we thought would be olfactory stimuli, which affects all other anadromous species, the herring and shad and everything else. Many of our streams have been compromised by sewage treatment plants put right on the coast, and you can imagine what the factory stimuli are to the very sensitive recruiting, either adults or young. Those are a few of the things I would like to throw out. But I don't think we've done enough to really assess glass eel quantities by the state surveys. It would be good to really emphasize maybe one or two states that want to hit it, how abundant those returns are.

MR. PAUL DIODATI: I just wanted to say a few things about the non-fishing mortality impacts that occur in this fishery and others, because we've talked about it a couple of times today and even yesterday in that business session it came up. Although the ASMFC isn't heavily involved in doing a lot of wetlands restoration, river work in terms of dam removals, improving passage for fish, the states are heavily entrenched in that.

We're doing an awful lot of work in our state parallel with the work that we do here with the commission. I wouldn't want anyone to think that we're not looking at the habitat impacts on these types of fisheries. Although when there are multiple impacts, and especially where the non-fishery impacts are critical, then I think it is even more important for us to look at controlling fishing mortality.

The document; and I appreciate all the work that went into it. I wasn't part of the working group,

but I did listen in on a couple of sessions. There is a nuance that I see with the way the document was prepared compared to my listening in to those meetings. That is that when I read it, it sounds like there was strong consensus on all these findings and recommendations, but my recollection during the sessions I sat in on that some of the consensus really wasn't clear on a lot of these things.

Again, it is nuance in some of the things I read here. Like I think there was a passage that in addition to the recommendations and options the way it is couched; there was a passage in here about the stock-recruitment relationships. I t basically made the reader think that it didn't exist, when the Stock Assessment Subcommittee don't know what it is. That is a big difference; not knowing it versus it doesn't exist is a major difference. I just wanted to bring those points out.

MR. DOUGLAS E. GROUT: I guess my question could go to both the working group and maybe the technical committee, but I'm going to shoot for the working group, because you're up at this point. I know this recommendation that if you were going to implement a glass eel fishery or if you had one, that you implement a life cycle study, sounded like a good one.

My question is why would it only be limited to states implementing or having an elver fishery? Why wouldn't it be a requirement – if we think this is important information that we need to collect, why wouldn't it be a requirement of any states that have, say, a significant yellow or silver eel fishery, too, say, greater than 1 or 2 percent of the coast-wide landings. Was there any discussion of making this more of a broader requirement if it is a data? I guess my question – and maybe this is a loaded question for the technical committee – is would that be a good idea to have a broader life cycle study in each state that might have a significant fishery?

MS. TAYLOR: The working group did not discuss it beyond the requirement for the glass eel fishery. That is something that the board could consider. The technical committee has discussed this, and, of course, they would

support any additional monitoring that would provide data to help for future assessments.

MR. BRADFORD C. CHASE: Let me just follow up to say, Doug, that the technical committee has discussed at length, and I think that we support it very much. There has been some resistance to move beyond a glass eel survey largely because of cost issues. If you do an appropriate life cycle survey, you need to age eels and so your cost would go up dramatically, but the technical committee certainly supports that.

MR. JOHN CLARK: I just wanted to follow up on what Dr. Stewart had said there. We've seen at our glass eel monitoring site the past two years have just been phenomenal in the number of eels that had come in. I know previous to that; the years before that many states had seen declines in the glass eels recruiting to their sampling sites.

There did look like there was perhaps the beginning of an overall decline in the numbers there, but they have come back to huge record numbers in the past two years. Where we were sampling, we used to just put the eels – it is a small system very close to the ocean, and we would put the glass eels that we caught up into the pond where we would trap these.

Several years ago we had a grad student do a study on the silver eels coming out of those ponds. It became pretty clear there is really not that much habitat up there. This is just another example of the huge surplus of glass eels that do come into certain areas where their survival potential is probably extremely low. They are attracted to some of these areas where they would not do that well. I just wanted to bring that up.

MR. MILLER: I would just quickly comment that it seems to me that requiring a state or jurisdiction to do a life cycle survey simultaneous with opening a glass eel fishery seems a little to me like putting the cart before the horse. It seems to me that if you want to justify a glass eel fishery, you should have the

life cycle survey information available to you first; just my comment.

DR. LOUIS B. DANIEL: Kind of adding on to Dr. Stewart's comments; a lot of the species that we manage hedge their bets. Batch-spawning sciaenids, they have a frequency of spawning maybe every week in hopes of having a single event that actually sets and the larvae settle out. We have hurricanes and we have all various different things that impact those spawning events.

We could talk about an overabundance of eel larvae or an overabundance of spot larvae or an overabundance of flounder larvae; to me, I struggle with this a lot. The question is does it have an effect on the population? That is the simple question that I don't think we can answer. My assumption is that there is such an abundance of elvers and natural mortality rates are so high; that I just don't see how this little bit of harvest at such an extraordinary value is going to have a measurable impact on the status of the stock.

To me that is the simple question that we have to answer here. I can't afford to do a full life cycle survey of eels, but I want an elver fishery. Am I out of luck? I don't necessarily think that is fair either, because I don't know if we'll ever know what is it, 5,000 pounds, 10,000 pounds of elvers?

Who is to say that one pound of yellow eels isn't the equivalent of a pound of elvers? With the natural mortality rate, I would think that it would take a lot more than a pound of elvers to result in one yellow eel. You could probably get even more elvers for a pound of yellow eels. Those are the questions that I think we have to answer, and I think those are the questions that we are going to have to be able to explain to the public. But the rest of it is all speculation.

MR. WILLIAM GOLDSBOROUGH: I just want to toss out sort of an academic comment that from an ecological perspective, I think it would be wrong to characterize it as an overabundance or a surplus; that there is a method to the madness in nature, if you will.

That abundance for any given habitat and the very high mortalities that are associated with it are all part of the process of developing and maintaining a strong gene pool that will vary up and down the coast depending on those habitats.

We might think in terms of being able to remove large numbers of those elvers as a acceptable, because a lot of them perish, anyway. But that is an important part of the process and we can't select the ones that nature would have selected to die. In addition, the ones that do die don't just disappear, but they are eaten by something. This is part of the food web at work as well. They do serve as forage for other organisms.

MR. THOMAS FOTE: Well, Bill, kind of beat me to the punch. We sit here and talk about the large number and the large mortality, but that mortality is feeding trout, walleye, and largemouth bass in a lot of the freshwater lakes. They depend on that. When we start looking at – you know, this is the kind of discussion we got in menhaden years ago when we started looking at the forage species and what is involved in the ecosystem management.

We don't have the science to do that. We would love to have the money to do the surveys necessary. When I look at the staff in New Jersey down to 13 people and a budget; Louis mentioned yesterday \$210,000 – I mean Wilson for the survey; I think that is almost 10 percent of New Jersey's Marine Fisheries budget.

There is no money. There is no money to do anything. It is a very difficult situation. But when we start talking about abundance of mortality, the reason we have abundance of mortality is because they're getting fed on by a lot of other creatures that depend on that in the ecosystem. Just don't throw out numbers and say, well, you can do this and it won't have any consequences. Whenever you withdraw something from the system, it has consequences up and down the food chain. Let's just keep that in mind.

CHAIRMAN STOCKWELL: Ok ay, I've got three more hands and then I want to go to the audience and see if there are any questions out

there. Then we really do have a time management issue, because we need to go to Brad's presentation and there is a lot more work to do this morning.

MR. ABBOTT: Thank you, Mr. Chairman, for allowing me to speak for a second time. This is such an interesting issue that we're dealing with. I'll be like Tom Fote and go back in history and remember when we took over management of eels, some of us wondered why we are managing eels, we don't know a lot about them. We really didn't want much to do with them. I confess that I didn't know very much about them.

In fact, I asked my colleagues this morning eels when they spawned, whether they had live young or whether they laid eggs. I didn't know the answer and I don't think they did either. But I did discover through the internet, Wikipedia, that an eel lays half a million to 4 million eggs down in the Sargasso Sea, and that those small things go through various life stages and they come up the coast.

The eels that migrate from Maine and New Hampshire and all the states don't necessarily deposit their young or the young aren't deposited back in their natal rivers. If we talk about the eels that in the past two years we've seen abundance of elvers return, that has nothing to do with the recent fishery, because I remember asking Mr. Chase at the last meeting about the life cycle.

We talked about a time span of 15 years. We could study the life history of eels from here to hell and gone and long after I'm dead and buried and you will still be about at the same place that you are now. We could ask ourselves this morning what are we doing today and why do we have to be doing it? Some people would tell you there is no reason to do any of this. Some people would say we ought to do habitat work.

I looked on Wikipedia again and the Department of Natural Resources in South Carolina and came up with 20 some recommendations on what we could do to affect the eel population; one of them being get rid of blue and channel catfish in their rivers. But the habitat that we

deal with goes hundreds of miles away from the coast. These glass eels; they are just migrating for a short while through the areas where they are being caught. Do we need to do something or do we need not to do anything?

But the very fact is taking eels out of one jurisdiction and one state affects all the states. It affects all the states. Again, everyone can make a persuasive argument to bolster what they believe is the right thing to do. We will never have another – well, we won't have another but we'll always be at this point of whether we should be making a decision regarding eels or not.

But from the very moment that we got into eel management, I recall that the Canadians primarily were telling us that populations had dwindled in the Great Lakes to such a great extent. I think there were some conversations and meetings between the states. That was a long time ago, in the early 2000's.

But are we going to fish or cut bait today regarding glass eels? That is where we should be focusing our attention. If we don't think there is a problem, if we don't think there is a problem, what are we doing here today?

MR. NOWALSKY: I certainly appreciate all the comments we've heard recently that goes beyond just the working group's recommendation itself and well into the discussion that we're going to be having as the morning goes on. I certainly appreciate as well the impetus that has been placed on the discussion of glass eels themselves. But just as we're getting to the end of wrapping up the working group discussion, I want to say that I think this document was exceptionally helpful to me.

Going back to – I certainly don't have a record of what the sentiment was in the room at the time; but going back to the minutes that we had approved, I believe the charge was to – specifically the words of the acting chairman at the time was that the working group will pick through the four issues we included, the numerous options under those four issues and

provide recommendations for this board to come back with options; as well as that it is difficult to predict where the working group is going to go, but we may require an addendum to do so.

I know when I come into a board meeting and I see final action on a piece of paper, it is certainly desirable for me to go home and tell my constituents we did it, we're done with it, we're moving on to something else. But I think the very fact that the working group laid out some recommendations for options, as well as a path forward for us, gives us the confidence to say, we're on a path, we're on a journey, we're not just here today to say we're done with this and we can move on to something else. I appreciate that effort.

CHAIRMAN STOCKWELL: Okay, Steve you have the last word.

MR. STEPHEN TRAIN: Thank you Mr. Chairman. I have listened to a lot of people around the room that know an awful lot more about this eel fishery than I ever will. I'm not an eel fisherman. I've got friends that are; I've witnessed them. We can blame habitat, we can blame climate, and we can blame fishing effort.

But when you see these eels gather up, as John described, in front of a dam or a fishway or something, that there are so many that if they actually entered that stream and the pond on the other side, the people that lived in that neighborhood would move if they actually survived to adulthood. The natural mortality is way beyond what the fish food web is eating. This species overproduces like you would not believe. To watch those die and wither away instead of be part of a coastal economy to me appears more wasteful than anything else we could do as managers of a fishery. Thank you.

CHAIRMAN STOCKWELL: How many folks from the audience would like to comment? Jeff, and then please state your name for the record.

MR. JEFFREY PIERCE: Thank you, Mr. Chair. My name is Jeffrey Pierce; I'm the Executive Director of the Maine Elver Fishermen's Association. We appreciate the

working group's efforts. As we look at quota management, I'm looking at a document that was produced yesterday. It is dated August 6th. I'd like everybody to take a look at something before we discuss quota management.

It is on Page 2, and under quota management that is the last section; it talks about the DB-SRA models. It says in the last sentence; "It should be stressed that the peer review did not approve DBS-RA models for management. Therefore, the projections are for visualization purposes only. It should not be expected to produce reasonable points of biomass over time." All these graphs, are we saying they're wrong or they are inaccurate? They shouldn't have been produced if they are just for visual aids. We can put graphs anywhere? If these estimates are not accurate, why do we have them? It is very concerning to us.

CHAIRMAN STOCKWELL: Jeff, you are making comments on a presentation that hasn't been made yet. Rick.

MR ALLEN: Thank you, Mr. Chairman. I would like to read into the record a letter from Kenneth Oliveira; PhD, Associate Professor of Biology, University of Massachusetts, Dartmouth, Department of Biology. This is an argument for a limited glass eel fishery to support aquaculture. "I am writing to support the request of the American Eel Farm."

CHAIRMAN STOCKWELL: I understand this is a two-page letter. In the interest of time; we're chewing up a lot of our time this morning. I am going to ask you to refer that letter. We'll have copies made and distributed to the board. Please make a comment.

MR. ALLEN: May I highlight the four points of support? To my knowledge, AEF is the only active eel aquaculture facility in the U.S. If this venture were established several benefits for the conservation of American eel could be realized. One, the elimination of transported eels would reduce the spread of parasites and diseases.

The swim bladder parasite found in American eels is suspected to having been introduced to

Lake Ontario by the transport of glass eels. Two, there would be no net increase in glass eel harvest since those currently purchased from Maine would be replaced by North Carolina glass eels.

Three, the use of glass eels that are typically subject to high natural mortality for the local USA production of market size eels; yellow phase, would greatly reduce the need for fisheries for the yellow and silver phase eels. These older life stages have a lower natural mortality rate and a higher probability of spawning, making them more valuable to the population.

Four, the collection of glass eels in North Carolina, if done correctly, could provide much needed data on the recruitment of the species, for example, timing of the migration, numbers per season et cetera, to the South Atlantic Region. Each Atlantic state is required to monitor glass eel recruitment on an annual basis.

This has created a burden on several Atlantic coast fishery agencies that are not equipped or funded to do these surveys. The dovetailing of the glass eel harvest with the monitoring efforts of the respected state agency could provide a cost savings for the state of North Carolina while generating the data needed to help manage this species.

I would just like to make the comment that American Eel Farm currently has no eels in it. In 2000 Mr. George Kuntz came here. At that time it was brought to his attention that there was some support from the Atlantic States Marine Fisheries for aquaculture. He invested 1.2 million dollars of his money. For us to compete with the Asian market, we need to have an advantage. The only advantage that we would have would be able to harvest our own eels. The benefit of harvesting our own eels would allow the American Eel Farm to restart and refill its tanks. If we would have to wait a three-year period for a survey, that would be detrimental to the opportunity that is there for aquaculture, so we've done our part. We ask that the board does their part and support us. Thank you.

CHAIRMAN STOCKWELL: Moving on to Brad. Do you have a burning question, Pat?

MR. PATRICK H. AUGUSTINE: Very burning, Mr. Chairman. Those gentlemen have been allowed to speak twice. I've had some conversations with them. The burning question is do we support aquaculture, ASMFC support aquaculture and eels? If we do, what is it we can do to give this enterprise an opportunity to survive or die? That is question one.

Question two, if we don't support it, why can't we make a statement we just flat out don't support it and tell him to go away and lose his money? It is ludicrous to sit here and talk about

– and this is a statement now, Mr. Chairman – to talk about the status of eels being depleted in our opening statement. The public says it was depleted and yet we have all these glass eels.

The public is not being as informed as we are around the table. What does depleted mean? What cycle of eels is depleted? Is it the reproductive eel that is eight years or older; is that what is depleted? What stage is it? I have a pretty good clue. But in listening around the table and listening to Mr. Abbott, I'm wondering if he is right.

We're sitting here spinning our wheels. We've got two documents in front of us; one that says this is a draft, a working document did an outstanding job of finding areas that were gray and had to be cleared up in the amendment. I'm sitting here now an hour into this meeting and have a sense I want to go ahead and postpone the whole damned thing and table it, because those are the questions that have been raised.

I look around the table and we have a bunch of blank faces, Mr. Chairman. I know your intention was to go ahead and move this aside and move forward with another addendum in a different venue, but I need the basic questions asked now. One, we could cause some action to occur, one; eel farming could take place or not. I think we need to address that before this meeting ends today.

Secondly, are we really going to address the problem of the availability of eels for all states? That is another burning question. It has been since we started talking about this procedure. With menhaden, we now have one state that has 85 percent of the quota. The state of New York that used to harvest the greatest number of menhaden for 20 or 30 years; 80 or 90 years ago; we have less than 200,000 pounds. I have one lobsterman who does 350,000 pounds by himself.

Here we go down another road with another species, creating another monster that we're going to have to live with, or people that follow us after. Mr. Chairman, if I can get the answer to those two questions either now or off line, let's let the public know where we're going with this, whether it is a viable industry or not and then take the next move. If we don't get this cleared up pretty quickly, I'm going to move to table the whole damned thing. Thank you.

CHAIRMAN STOCKWELL: Well, Pat, you ask good questions and they are what will tee off the second part of this meeting. We're going to go through Brad's report, take questions and then take a break and regroup. Take it away, Brad.

MR. CHASE: Thank you and good morning. I am going to report on the Stock Assessment Subcommittee's communications in the last few months in response to requests from the working group. We met via conference call I think three times in June and July, and we had just numerous exchanges of e-mails back and forth.

The technical committee did not get together to discuss this. The timeframe was too short. I'm just going to report on the Stock Assessment Subcommittee. Okay, when the request came in, it is fair to say that each member of the subcommittee had concerns over the idea of finding ways to open new fisheries or keep harvest at the current levels. This was a unanimous concern of each member.

Really, this quote here from the stock assessment I think highlights that concern. Really, the bottom line was to find ways to

reduce mortality for all fisheries. I am going to run through the general recommendations that came out of the Stock Assessment Subcommittee's communications.

Number one is that the status quo is not recommended. We've heard this really from the stock assessment as well as the plan development team. That is clear. Number two is the objective of the addendum is to reduce mortality of all life stages with a goal of allowing more silver eels to escape and spawn.

If mortality is to be reduced, then fewer eels need to be harvested. All fisheries in all regions must contribute to the reduction. Number three, opening up any new fisheries on any life stage would be inconsistent with the recommendations of the benchmark stock assessment and peer review panel.

Number four, starting multi-stage surveys after the glass eel fishery is opened would not be adequate. To follow the precautionary approach, a state should have to implement multi-stage survey monitoring programs at least three to seven years before being allowed a glass eel fishery in order to verify that further harm to the stock would not occur.

Number five, the only way to guarantee reduction in mortality is through use of quotas – and this is for all fisheries – with specific allocations and payback provisions. The states should not be allowed to increase landings from current levels. For both the glass and the yellow eel fisheries, the SAS recommends that we use the terminal year of the stock assessment which end in 2010.

For general recommendations, for the yellow eel fishery the quota should not be based on landings from the 1980s, because this was a period of very high fishing pressure and catch. The quota should not be based again on landings for years after 2010, because this was the last year of the stock assessment. Landings have continued to increase in the yellow eel fishery since 2010.

In the glass eel fishery, similarly the quota should not be harvested. The landings data should not be used after 2010; 2012 in particular was a year at which the fishery changed dramatically with very high prices and was marked by higher effort landings and illegal harvest. Setting catch limits based on recent average catches leads to higher probability of overfishing and depleted populations especially when populations are already at low levels.

We know this from other fisheries and there has been some recent scientific literature that has come out showing that this is a big concern, particularly if we focus on just the most recent years. Number six, changes in mesh sizes and minimum sizes alone may not achieve the reduction in mortality necessary to rebuild the stock.

It is uncertain how adult eel escapement will respond to this action. SAS does not oppose the use of minimum sizes and mesh changes, but just wants to emphasize that this alone will not achieve what we're hoping to do, and so we need to match this with quotas. Number seven, increasing the survival of silver eels is crucial in ensuring the highest contribution to the spawning stock.

This was really the main goal of Addendum 2. As most of you know, really no conservation measures came out of Addendum 2 to address this, so it is still on the table and still very important. Number eight, the SAS strongly supports the collection of additional fisheries-dependent and independent data to aid in the development of management programs for the use in future stock assessments.

This, of course, focuses on the life history cycle in those surveys. For quota management, the working group requested input from the SAS on harvest levels that might be appropriate given the associated stock levels. The SAS had very little time to address this, but we did. We used the DBSRA, the depletion-based stock reduction analysis model, to do this.

Jeff Brust from New Jersey did a fantastic job putting this together and updating the stock assessment mode. The SAS overall I think

really responded very quickly to get something for you to see today. This model really comes out of the west coast. It is a hybrid of a surplus stock reduction models. It has been used more and more on the west coast for data-poor situations.

We did apply it for the stock assessment. To Jeff's point earlier; the peer review panel did not accept it for use for reference points that could be used for management purposes, but the peer review panel did strongly endorse the selection of this model and felt that it was very encouraged by the potential to use this model in the future.

We thought it was a good choice to go back and look at potential biomass levels in the future given different harvest scenarios. I am flying through this fairly quickly, so if you have any questions on the model, I would be happy to answer them. It should be stressed the peer review panel did not approve the model for management; therefore, the projections are for visualization purposes only, and some results may not represent credible estimates of biomass over time.

This point, it is a little confusing but again it produced reference points for biomass and fishing mortality that were not accepted by the peer review panel. But it did provide useful information on how the stock might respond to different harvest levels. Let me run through some potential scenarios. This table shows in the average harvest column what was actually harvested coastwide for yellow eels; most recently 2009 to 2011, almost a million pound fishery on the east coast.

Then we have two other scenarios, 2007 to 2011 and 2007 to 2010; and then the other columns show what we would have if we had reductions from that; 10 percent, 25 percent and 50 percent. The stock assessment gave us pretty clear guidance that we had to move back from present levels of harvest. We wanted to give the board some ideas of how this might look using this model. Here is the first graph that shows 2009 to 2011 with present landings with no reductions.

The red line is the median estimate projected into the future. The dotted line is the 75th percentile, and the hash line is a 25th percentile. The model was run and it forecasted the present biomass levels into the future. You can see where the median level for this level of harvest, we have very modest gains moving out almost 30 years into the future.

Here it is 2007 to 2011 without reductions. Again, the Y axis is spawning stock biomass in millions of pounds starting in 2000 moving to 2030. The median here starts to show some gains with this level of harvest; sharp gains were the 75th percentile and moving down to nothing with the 25th.

Here is 2007 to 2010. The SAS felt that again the 2010 should be the last year used, because that was the last year used in the stock assessment. This was a scenario that we wanted to show you. The median level shows decent increases, and the 25th percentile is a flat line moving out into the future. Okay, so here is the 10 percent reduction from that last scenario, 2007 to 2010. The same idea hauling back just 10 percent results in increases at all across 25th to 75th percentile and in decent gains with the median.

Here is a 25 percent reduction from that 2007 to 2010, and here is a 50 percent reduction from 2007 to 2010 with sharp gains under all scenarios. This would get the stock fairly close to the level that occurred in the 1970s when we had some very high landings up and down the east coast. That is about where it would get us back to is near that peak biomass.

This is something that was done really in the past week or so, and so we could entertain all types of requests and look at a number of different scenarios, but I wanted to show you what this model can do and what potential it has. Here is a graph that shows the biomass estimates from the model going back to 1880, and this gives us a good idea of what has happened in the fishery.

Some folks wonder is the stock depleted; have we seen depletion occurring? If you look at that

rise from the seventies and eighties; that was the period where the European export market took off, prices for our fishermen went from about 50 cents a pound to two dollars a pound, effort increased and harvest really increased. I think the SAS feels that period really contributed to our present levels of abundance, which we do consider depleted.

That level of harvest was something that was probably damaging, and we should probably try to avoid getting back to those levels. You can see we've come down to a low level from then and we are rebuilding. Under different levels of harvest, you can see we increase at different levels here. All the previous graphs are overlaid on the right side of this graph.

Here is a different scenario I showed earlier, just showing from 2000 to 2030. The red is the harvest from 2007 to 2010. That is the median level for that area and you can see sharp increases at the 50 percent cut and very moderate increases with the status quo, status quo for 2009 to 2011.

That was a very quick presentation on the model estimates for harvest levels and I would be happy to entertain questions on those afterwards. Let me shift to the question everyone is talking about, the life stage quota transfer; shifting yellow eel quota to glass eels. We received this request and it was a difficult discussion. There were members that felt that we simply did not have the information to provide an answer to this question.

We went back and we worked on it. We actually assembled a model, a very simple survivor model that would allow us to forecast changes in survival for eels at each cohort and what would be left by applying mortality estimates to each age. We have this tool available; it is something we can work on.

I'm not going to present it right now, because we felt it had so many assumptions and it really has limitations given the input data. Our recommendations are while it may be possible to conduct conservation equivalency analyses on the life stage of American eel, this analysis

would be based on a multitude of assumptions and have a high degree of uncertainty.

Number two, states and jurisdictions do not currently collect adequate data to support this type of management program. Given the spatial heterogeneity of eel life history, the SAS could only produce estimates for geographic sub-regions where there are data to support analyses. Furthermore, this type of analysis could result in different management methods applied along the coast.

Really, every watershed could produce different levels of natural mortality and age-specific survival. The information we have presently is just very limited to approach this type of analysis. Number three, the SAS unanimously and firmly does not support a one-to-one transfer in pounds of current yellow eel harvest to potential glass eel harvest.

This is really a precautionary approach. We have concerns over not having the right information and not producing the right recommendations. Our idea was to have a cap or a proportion transferred as opposed to a one-to-one transfer. Number four, if a conservational equivalency program were to be developed, the SAS recommends the use of a conservative transfer rate until there is sufficient data to consider expansion, with harvest capped at a certain amount.

One possible approach could be to evaluate the complete transfer of yellow eel quota to a glass eel fishery after three years of a development of a new glass eel fishery, provided the required monitoring continues in the fishery on all other life stages prohibited within the jurisdictional waters. The idea here is again until you have a survey, you really don't know what you could possibly do to the fishery.

We are recommending having survey information in that jurisdiction before the glass eel transfer is made, and then with three years of data you could begin to evaluate what you have done and make further recommendation. You can see the SAS is somewhat resistant, almost reluctant to engage in this analysis because the

information just isn't there. At the same time we did produce that survival model, and we realize that theoretically it can be done. We would like to work with the board moving forward. But with the time that we had and given how important this issue is, we presented a very conservative approach. Thank you.

CHAIRMAN STOCKWELL: Thank you, Brad, and for the rest of the subcommittee for your above-and-beyond effort to respond to the data request from the working group. I've got Ritchie's hand.

MR. G. RITCHIE WHITE: Thank you, Mr. Chairman. I have two brief questions. First, the recommendation is to reduce mortality to the 2010 level for the glass eel fishery. Is that about 4,000 pounds coastwide?

MR. CHASE: That wasn't a recommendation, but it was to use the data up to 2010 to develop your recommendations. It wasn't to use just that year, but your analyses should end with 2010.

MR. WHITE: Second question; in the recommendation of not supporting opening of new fisheries, did that assume that opening new fisheries would increase mortality? If you open new fisheries and reduce mortality at the same time, would there still be opposition to opening new fisheries?

MR. CHASE: That is a good question. Really, it comes down to the unknown. I think the SAS was just – we saw some momentum in the PDT towards reducing mortality, pulling back from present harvest levels, and then this was a shift to open fisheries. I think the SAS was a little bit concerned about this approach and the unknowns. I think that we're not completely against the concept, and we would entertain requests to do analyses, but at this point the information is just not there to really allow us to say, yes, let's go ahead and do this.

MR. WILLIAM A. ADLER: In listening to the response here, I see a lot of unknown. Here we are trying to put some rules in, I guess. I am listening or I see in one place here it says that the visualization purposes only – that is one

place. I also see that there is a multitude of assumptions and have a high degree of uncertainty.

Some other things are unknown. Some of the information could only produce estimates. Once again, I'm trying to figure out, okay, so where are we? Do we have scientific information that we need to go forward and put some of these things in? Somehow I am just not seeing it, but thank you.

MR. CHASE: I think the bottom line that comes out of the stock assessment is we have to kill fewer fish. I think that evidence to us is clear. The stock is depleted, and so we have to bring back present harvest levels in the yellow eel fishery and the glass eel fishery. That to the SAS leads to quota management.

The DB-SRA was one of many approaches we reviewed in the stock assessment. It was received well by the peer review panel. Their language was that they were very encouraged by the selection, the use and the inputs in the DB-SRA model. Projections will always have uncertainty; that is the way it is.

We view it as a tool that will gain use and gain confidence with the next stock assessment. For now it gives us guidance on how we can pull back from present stock levels. I understand your concerns with uncertainty. The conversion from yellow eels to glass eels is even more difficult. But if we can segment the two concepts, the yellow eel quota and the conversion, I think we can possibly make some progress.

REPRESENTATIVE CRAIG A. MINER: I am wondering whether some type of a grow-out opportunity coastwide might mitigate the concern that you have about depletion. Listening to two individuals speak already about mortality at the glass eel stage, in some cases perhaps based on not being able to get beyond a structure or something else, isn't there an abundance there that if it was a targeted fishery in certain areas that we actually can kind of beat the system by not having those die and go to waste, but instead either harvest some of those

either for an aquaculture opportunity or aquaculture plus redistribution opportunity?

It just seems to me that if we do this solely based on reducing mortality numbers at the adult stage, we're not necessarily taking care of the environmental problem that might have actually been what was referred to very early on. I guess I am asking you what your opinion might be about that kind of a model rather than sitting back and waiting for three years by reducing the amount of take.

MR. CHASE: Well, again the SAS is going to say we have to reduce mortality. We have to bring back our present harvest levels. We did not discuss the idea of innovations such as culture in the U.S. I think it is a fascinating concept and I think we would be happy to entertain recommendations for analyses. That is something we can address, but we did not discuss that. Personally I think there is some potential there.

REPRESENTATIVE MINER: I was having a conversation with Dave Simpson, and I don't know if this is a phenomenon that is happening coastwide, but in the state of Connecticut we've had a number of conversations about closing fish hatcheries that have historically been used for rearing trout for stocking programs.

It just seemed to me that we may actually have the infrastructure in place in Connecticut where we could take a certain population of glass eels and perhaps either by leasing or whatever develop a farm to create bait where maybe flavor and color aren't that important and at the same time reestablish a population back into a natural spawning area. It just seems to me that if we look at the same theoretical science model for all these species, I'm not sure we don't end up in the same place. Why not look at something different? Do you need a model to actually model what I'm talking about or can you do it from some theoretical idea?

MR. CHASE: I think you would need analysis. We're recommending that we reduce mortality; that we kill fewer eels. What you're suggesting is to take more eels. We would want to assess

that. We can discuss it theoretically, but I think we would need analysis to support what level of that type of redistribution would be appropriate.

MR. FEIGENBAUM: To my fellow commissioners, I would like to point out something that some of you might be aware of, but I just hope it is very clear. The DB-RSA model is basically just telling us what technical committees have been for the last 30 years with the understanding that technical committees spike so much, but a model need to be smooth.

As Jeff Brust had explained to me, what the model basically does is it plugs in the technical committees from the past, and then it smoothes them out in order to create an illustration of where stocks are. Tom yesterday from New Jersey made the point that the public loses confidence in a lot of the work we do, because we present them a population estimate based on technical committees that absolutely make zero accounting for the effort.

Of course, Marty and others have explained really for years and years to this board that the ban on the horseshoe crab harvesting has in and of itself reduced eel fishing effort and eel fishing technical committees more than anything that this board has ever done or could do. I see a few heads shaking around the table in agreement.

Brad, I have a question for you. If you were to impose a coast-wide quota on yellow eels, three years from now what model would you use to determine whether the populations are increasing. As I believe Jeff has acknowledge to me, you can't use the DB-SRA model at that time; because if we mandate that technical committees go down, then three years from now the DB-SRA model is going to tell us that stocks have gone down.

That is what the model does. It basically shows us what the technical committees have been and converts it to a statistical, flatter diagram. Brad you said something; you pointed out that model shows that we had a harvest high in the seventies, and you said we've come down from that and we are rebuilding.

In fact, that model shows that we've been rebuilding for 14 years; and during the last 14 years, the stocks are up 41 percent. It brings us really to Pat's question, which is the most important question, what does depletion mean? We have 14 years of rebuilding at a 41 percent level, which leads to a conclusion that we've been depleted.

I've asked a question of the Chairman in the past or our Executive Director, what is the definition of depletion? There really is none. It could mean exhaustion; we know the stocks aren't exhausted. Recruitment has been steady for 30 years. It can also mean significantly reduced. I grant you that based on what we know about habitat loss and the excessive harvesting in the seventies, the stocks likely are substantially reduced from where they have been.

All of which leads to one conclusion that might sound a little controversial, but I hope my fellow commissioners will hear me out. We keep saying that the goal here is to reduce fishing mortality, but frankly in my opinion that is not really an appropriate goal. The appropriate goal is to ensure that there is no increase in fishing mortality that would potentially bring us back to where we were in the seventies, which we think caused the problem in the first place.

We're in a good place right now, particularly in the yellow eels which have not shown a growth in harvest or effort in some 14 or 15 years. Really, we would be making a great accomplishment and doing the species a great service in the yellow eel segment of the equation if we could just ensure that there is no increase; that we don't go back to the seventies.

Someone said there is a lobsterman in New York that is harvesting 250,000 pounds a season, one boat. The entire coast of USA is harvesting less than a million pounds of eels. It is probably the smallest overall harvest of any species this board manages, yet the Fish and Wildlife Service told us it is the most ubiquitous species on the entire freshwater system of the United States east coast.

There is some really good stuff in our addendum today. The working group has come up with a lot of low hanging fruit. This group can accomplish today a lot of really good things to put the brakes, to lock into place a scenario where we do not go back to the seventies. But to suggest that we need to reduce from some recent average, which is the lowest point we've been in recent history, to go further down from there based on the projections of a DB-SRA model that has been identified as not appropriate for use for management, it seems like the Stock Assessment Committee – I understand they're doing their job, but they are taking a very – you call it precautionary, but I would respectfully suggest that it is starting to sound a little like it is an excessively cautionary approach.

We also have to be cautionary about the economy of a fishery that soon will reach such a low point that it is just not sustainable commercially. We cannot have an eel industry along an entire coast if the technical committees come down to something like 500,000 or 600,000 pounds. It is just not enough resource to even support the few commercial interests that are still in the fishery.

MR. BILL ARCHAMBAULT: Just a quick comment and a question for Brad. We've been in the salmon business for a long time in the Fish and Wildlife Service; and although we have seen a couple of good year classes of parr and smoltz going out, I don't get too excited anymore when I see one or two good year classes, because that does not necessarily correlate with a good return of adults.

In particular in the Great Lakes, although you folks and those on the east coast here have seen a couple of good years of elvers and glass eels, they have not seen those numbers in the Great Lakes, and they haven't seen those numbers in decades. We really need to consider a conservative approach here. There is a lot going on with the eel outside of the harvest.

We have some pretty major rivers on the east coast. We're dealing with some major FERC relicensing right now, and our state partners are helping a lot. There should be some real

conservation benefits to be gained there but we've got a lot of work to do. In particular regards to using hatcheries, having been in the hatchery business and again in the salmon realm for a long time, we're really in a different place here. Taking fish out of the wild to use in a hatchery to grow out those fish would probably not be the way to go.

It can identify a whole realm of problems, domestication, disease and so forth. While I do understand the aquaculture role, and there is a role for aquaculture here, I would be very hesitant to approve any type of hatchery work with regards to a wild population. That could lead to some big problems.

Again, the uncertainties in a diadromous or catadromous fish really cannot – you can't get excited about seeing one or two year classes. That is a good sign and hopefully that is a good trend, but you have got to look across a generation. That is something we need to consider. Brad, on the west coast you mention they are using this model. Can you talk a little bit about what they are using the model for and some of the parameters you might need to work out here to refine that model.

MR. CHASE: Yes, it really originated for data-poor situations where you mainly have harvest data. It has been used I think in rockfish fisheries and those type of fisheries, long-lived species. Really, if I can get back to Mitch's comment and to address yours as well at the same time, I would like to defend the model a little bit, because the peer review panel actually had some very supportive language for this.

They endorsed the use of the selection of the model and they were very encouraged by the results. When we say it was not accepted, what happened was the technical committee recommended that given the assessment results, the stock should be declared overfished and that overfishing was occurring. The Peer Review Panel did not accept this conclusion. What they did not accept was the reference points generated from the model, the biomass and fishing mortality at MSY.

The model results were not quite appropriate or ready to produce reference points that could be used for management purposes. I would say that the model is going to be a useful tool. I think the peer review panel had a lot of support for the model. In addition, it does use much more than harvest levels. It looks at carrying capacity; it looks at natural mortality rates which are inputs, and it also uses coast-wide indices of abundance.

We had as an input 1990 to 2010 the coast-wide indices for yellow eel abundance. Those indices can tune the model and it has that potential to look forward as well with the projections. We also looked at over 30 coast-wide indices independent of the model that went into the stock assessment. When we ended up with a depleted status, there was a lot of consideration and discussion for even a more severe status. The Peer Review Panel reined us in and brought us back to depleted.

What the model needs looking forward, because I really think for the next stock assessment it is going to grow, it is going to improve, and I think it going to become a tool that we do use; it needs better natural mortality rates. We need a better understanding of carrying capacity, which means habitat capacity.

These inputs will be very important to make a better model with high confidence. The model is run with 10,000 iterations of a range of input values. Then it rejects the ones that are just absurd. The remaining iterations are used to actually produce the projections. It does get rid of, in my mind, a lot of the uncertainty that people have. The end results are really tuned down to credible projections. Then on top of that, you have your confidence levels around the median. I hope that answers the questions and also responds to some of Mitch's comments.

DR. DANIEL: I have a few comments. The first is the intriguing question of harvesting the eels in areas where they would not normally be able to move upstream. I would just caution us about that approach, because I wouldn't want to do anything that would promote not restoring habitat. If we were to find these areas where we can harvest these eels and then all of a sudden

we have an opportunity to open it up, if someone is using that area as their eel harvesting area, you are going to have pushback from those types of restoration efforts. That would make me nervous.

I just am looking at the status state of our fisheries, the opportunities for aquaculture; not just in North Carolina but wherever, the creation of jobs. This is an opportunity unlike really any other fishery that I am aware of. When I look at the value of this fishery to Maine; like I've said before, it is worth more than our two top fisheries in North Carolina combined; shrimp and crabs. That is a pretty spectacular value. We've got to figure out a way to make this work.

All we're talking about is we can't do it. That is a lot of what I'm hearing is, we can't do it. We can do it. We should do it. I do support the technical committee. I support your defense of the thing. But one statement though in the technical committee report that I found kind of intriguing was after Mr. Adler pointed out all the uncertainties, and that is inherent in virtually any stock assessment. But then for the Technical committee to come back and say that they firmly oppose a one-to-one; that seems kind of contrary to me.

With all the uncertainty and all the concern about the information in the assessment, to come back with anything firm seems a little out of character of those previous comments. I don't think it is; I don't think anything should be firm at this point. But I think there is a conversion rate. If it is not one-to-one, it is maybe two-to-one, maybe one-to-two.

I don't know what the number should be, but that is the number we need to figure out. I would be cautious moving forward with this. I certainly don't disagree that we need to reduce harvest on these larger life stages, but just keep in the back of your mind the shrimp fishery. Just keep in the back of your mind the shrimp trawl industry and the bycatch associated with that industry, and the move forward that we've made in this commission with the weakfish stock assessment, the croaker assessments;

where we don't even consider that significant amount of bycatch as even being a part of the management decision-making process.

That to me; there are some parallels to this elver fishery. That natural mortality rate is so extraordinarily high. I hate to say, well, if we don't kill them, something will eat them. Well, that is good; right, Tom that something else eats them. But I'm not really concerned about the bluegills that are sitting at the dam picking them off as they come across. I don't manage bluegills. All right, we can make more blue gills. I am concerned about marine fisheries, and I'm concerned about marine fisheries economy and economics. I think this gives us a great opportunity.

MR. CHASE: Let me just say quickly that I wish we had a few more days to really work on that language. It literally just was evolved yesterday, maybe Friday. We had a lot of discussion on the one-to-one conversion and how would you actually put that transfer into play. We all felt we should be very conservative until we had better information.

MR. CLARK: Thank you, Mr. Chair; great presentation, Brad. I just had a question on the graph you have up there. Now is that as Mitch referred to a part of the DB-SRA, because it seems to be showing that at current harvest levels, it is sustainable; that as you go in time, the stock does not decrease.

MR. CHASE: Yes, John, those are projections from the DB-SRA. The harvest from 2009 to 2011 shows the least percent increase moving forward. That is correct; it is a modest increase. We also felt that reflects very high levels in the yellow eel fishery. That would be just 2009 to 2011.

MR. CLARK: Right; but based on the model, the median quota there is not showing any decrease in the landings level over time; actually showing a slight increase even at the 942,000 pound level.

MR. CHASE: Right; that is correct, but I will remind you that the 25th percentile hits the X-

axis. The median shows a modest increase, 75th shows better, but the 25th is going down to nowhere.

MR. CLARK: Yes, I saw that.

MR. CHASE: We should keep that in mind. The further you get from your end year, your projections have greater uncertainty.

MR. CLARK: Right. I just had a comment about the aquaculture. Just to remind everybody that Canada has been – it is somewhat along the aquaculture line. They have been stocking glass eels from the Maritimes into tributaries of the St. Lawrence now for I think over ten years. Mitch, what is it; like 15 years they've been doing that?

MR. FEIGENBAUM: Well, it has been happening for the better part of the decade, but it did stop in the past years because as the gentlemen's letter from Ken Oliveira pointed out, there is concern that the parasite was introduced into the Great Lakes because of it. The eels are there and are doing well. They are also not becoming as female as would be expected of the Great Lake. There are a lot of questions being raised about this program.

MR. DAVID SIMPSON: Thanks, Mr. Chair, and thanks for the presentations, it is really helpful. I still struggle with eel fishery management and trying to put it in perspective, you know, those losses to other sources of mortality. This issue comes up with every species. It comes up more often than I can stand sometimes for lobster.

But I can always look at our indices of abundance by size right to the gauge; and then I can see immediately after the gauge the tremendous drop in abundance. That reassures me that, yes, there is a role in fishing and there is some leverage, as a former employee used to like to say, in fishery management to make the stock respond.

I don't have that same comfort level with eels; trying to understand what proportion of the mortality are we actually able to manage here; in particular, things like turbine mortality, for any kind of system where the eels that we work very

hard to get up past an obstacle have to go back down through. What percentage of eels that pass through a turbine – and I know it is size-related, but what percentage will actually survive? Help me with the perspective that I need for fishing versus all these other human-induced causes of mortality.

MR. CHASE: I'll try. Obviously, we're data poor here. We have very poor age structure data, so we don't have a great sense of what our fishing mortality is by age. We don't really have that coastwide. What we have are indices of abundance, catch and effort indices, a few age structure sampling programs. We've pieced all that together. Other fisheries have much more.

They have much better age structure data. That is why when we encourage life history surveys, we're trying to get that information. If you partition mortality, we can picture that natural mortality is very high for a species like this. That is their strategy; send a lot of juveniles to the coast.

Then they are going to experience fishing mortality and then things like turbine mortality, pollution, lack of habitat; all these things contribute. Climate change is a concern on high mortality for eels in the marine stage. It is something we haven't talked about much so far today, but we have no assessment on what the mortality is for the leptocephali while they're at sea.

If we try to assign mortality levels to glass eels, we're still not addressing what happens before they arrive. They can migrate for a year and a half from the Sargasso Sea to our coastline. We have no assessments for that life stage mortality, and so that is very important. If we look at a conversion, we're going to have to develop a model that assumes mortality levels at each age, and that is going to be difficult.

Your question on turbine mortality; there are studies out there that assign mortality estimates, and it is, of course, valuable to the turbine type in the watershed. But it can be high; it can be over 50 percent. It is something, it is very important; it has to be on the list. I think that

those who work with FERC and work with these relicensing, they're dealing with that issue.

MR SIMPSON: Just a shot in the dark in a system that has a dam and a turbine facility in it; is the fishing mortality 10 percent, half, three-quarters of the mortality of that population; how much leverage do we have here?

MR. CHASE: Great question. Again, I'm a stuck record. We don't have that information; but if you look back to Jessup's study on glass eels in a Nova Scotia stream, he found very high natural mortality, as you would expect. He also attributed this in part to very low water pH in that stream, as well as the impediment of the first berry these eels had would cause them to delay their migration and increase predation at that point.

His recommendation was that you could approach a system like that where you had very high natural mortality, anyways; or if you had turbines that would affect them later on, that would be a system at which you could support a higher level of harvest in the glass eels. Those are type of watershed-based decisions that I think this board can consider.

MR. MARIUS SIETSE BOUW: Yes, in Europe they have – in Holland they did a test and they lose about 80 percent through turbine mortality; but now they designed a new turbine that is 100 percent stressful. They have designed a turbine now, yes. It is possible to do something about it, but it is a lot of money. The turbine mortality is very, very high.

CHAIRMAN STOCKWELL: Ok ay, I see Rob's hand and then we are going to go to the audience for any comments specific to Brad's presentation. Then we're going to take a break to regroup.

MR. O'REILLY: Brad, my question is – I'm looking at what was mentioned earlier, the 30-year index of abundance for yellow phase American eels along the Atlantic coast. It ends in 2010, and I know that the assessment is through 2010. But my question would be has 2011 and 2012 data been applied yet? If so, how

does that look? When you do look at the 30 years, it is not flat.

There was a higher period up through about from 1981 and probably through about 1987 or so. After that, it is a relatively flat trend, a little variability. It looks like in 2010 with the – I guess they are standard error bars, it actually is increasing in 2008, '09 and '10. I don't know whether you've updated any of that.

MR. CHASE: The DB-SRA model used for projections did include 2011 and 2012 landings data, but the indices of abundance have not been updated since.

MR. GOLDSBOROUGH: Just a real quick one. The red line, Brad, that is the 10 percent reduction; is that right?

MR. CHASE: No; that is just the projection for the median estimate for 2007 to 2010. If we maintain that harvest level –

MR. GOLDSBOROUGH: That harvest level; isn't that harvest level the 10 percent cutback from the current; is that right?

MR. CHASE: No.

MR. GOLDSBOROUGH: From your previous graphs.

MR. CHASE: Would that be the 716?

MR. GOLDSBOROUGH: Seven sixteen is 10 percent?

MR. CHASE: Yes; that would be the 10 percent.

CHAIRMAN STOCKWELL: Audience; any questions?

MR. ALLEN: If I may, I just wanted to have some clarification in the comments about disease related to aquaculture facilities.

CHAIRMAN STOCKWELL: Would you read your name into the record, please.

MR. ALLEN: Yes, Rick Allen from American Eel Farm. In a letter from Kenneth Oliveira; what he stated is that the elimination of transporting eels would reduce the spread of parasites and disease. The swim bladder parasite that was found in American eels is suspected of having been introduced to Lake Ontario by the transportation of glass eels; not by aquaculture facility.

I would further like to comment on the gentleman – I'm sorry I don't have your name here, but it seems that you feel as though that the aquaculture may not support a species, and I would like to argue that aquaculture is about a \$50 billion industry around the world. Harvesting seed for a species, there is plenty of scientific data that supports aquaculture around the world. There are many agencies that support aquaculture around the world.

Also, the European market this year has a banner season with over 100 million eels they suspected came into it; and all these eels also come from the Sargasso Sea. There is plenty of data out there. I think it has been 13 years that a comment was made that we should do something with aquaculture, and we should look at these species back in 2000.

There has been plenty of time for studies. To stall for a study to prevent an aquaculture farm from moving ahead I think would be a decision that would not be favorable. It certainly would terminate the opportunity that exists from the table with the American Eel Farm. We would not be able to wait around for a three-year period for some study that there is plenty of information of. You can Google aquaculture and find out plenty of information about it. Thank you for your time.

CHAIRMAN STOCKWELL: Are there any other questions from the audience? Bill you have the last word.

MR. ARCHAMBAULT: Yes, just a quick clarification. We do support aquaculture as an industry. My concerns with aquaculture were in regards to the comment of using a hatchery to

buffer or bring back wild populations, but we do support aquaculture as an industry. Thank you.

CHAIRMAN STOCKWELL: Thank you for the clarification. We're going to take a 15-minute break and regroup and reconvene at quarter of eleven.

(Whereupon, a recess was taken.)

EXECUTIVE DIRECTOR BEAL: We will go ahead and reconvene the American Eel Management Board. Dr. Daniel, you had a comment before we jump back into it.

DR. DANIEL: Yes, I just wanted to apologize for my bluegill comment. I am sorry; I did not realize we had such a bluegill aficionado crowd. I love bluegills, too, but I won't ever say another word about a freshwater fish.

EXECUTIVE DIRECTOR BEAL: Thank you for getting us out of that spot, Louis. I thought we were going to have to start a Bluegill FMP. I think all the reports have been given out. As Terry mentioned at the beginning of the meeting, he wanted to be able to participate fully in this portion of the meeting. Tom O'Connell from Maryland is the Vice-Chair of this board and he has the same sentiment. Since given the importance of the yellow eel fishery in Maryland, Tom wanted to be able to participate. I've been asked to stand in for the remainder of the meeting.

Where are we? I think we're at the point of the meeting where we've had all the reports; we've had all the questions asked and answered as best we could. We've had the report out from the working group that had four or five conference calls. The Stock Assessment Subcommittee had three calls, I believe.

We're at the point where we're not going to get a whole lot more information the more we ask of working groups or Tech Committees or anybody else. I think we're pretty close to the limit. It gets to the point where the judgment of the commissioners is probably all that remains, and the group needs to decide how they want to proceed.

DISCUSSION OF MANAGEMENT OPTIONS, RECOMMENDATIONS AND ACTION

EXECUTIVE DIRECTOR BEAL: With that, I think the best way to craft this conversation is to get a motion up on the board, see what the sentiment of the group is, and then we can proceed through that. We've got Addendum III that has already been out for public comment. We can finalize portions of that. There were also recommendations of the working group to start Addendum IV.

It is sort of a similar spot that the Lobster Board was in yesterday, where they finalized some portions of the management program and then they took additional portions back out for public comment. That is one potential course of action. We've got a little over an hour. We've got a very full schedule this afternoon; meetings scheduled until 6:30 p.m.

I don't think we have the luxury of going too far over the time limit for this board. I think if we get much past noon; I am going to take a quick break and talk with Paul Diodati, the Commission Chair, and Louis as Vice Chair and Terry is the Board Chair, and we'll just huddle up and decide what the best course of action is. But let's see where we can get in the next hour and then we'll decide where to go from there. With that; does anyone have a motion to get us started? Mr. Stockwell.

MR. STOCKWELL: Yes, thank you. Mr. Chair, I really appreciate you sitting in that seat. I listened carefully to everyone's comments this morning; and having participated in the working group, I originally intended to make a motion to approve the working group recommendations and postpone final action until the fall meeting.

To move things along to today; there really are a number of measures that can be approved today, including the habitat and the monitoring issues, the pigmented eel issues, the silver eel and the recreational fishery measures. The tone of this morning's discussion indicates clearly to me that the board needs more time to develop the glass eel measures and consider the yellow eel

measures that were recommended by the working group.

It is sort of a backwards way of doing it; but what I want to do is separate the glass eel and the new measures from this addendum so that we can approve Addendum III in part today. **I am going to make a move to initiate Addendum IV to develop the four new working group recommendations; the potential new glass eel fisheries, the glass eel quota management options, the yellow eel quota management options and the yellow eel limited entry.**

EXECUTIVE DIRECTOR BEAL: Thank you, Terry. We'll get the wording up on the board and perfect that. Is there a second to that motion? Mr. Augustine. All right, are there comments on that motion as that wording gets perfected up there? Terry, do you have any additional comments you would want to provide?

MR. STOCKWELL: We've done a bucket load of work. There are expectations that we get something accomplished today. There is low-hanging fruit I think we can incorporate into Addendum III and take our time to think carefully through the many issues that Brad raised this morning; address some specific measures that will do the right thing for the eels and sustain the fishery.

I don't have the answers today, and I do know at least from Maine's perspective the answer isn't to close a fishery. From the states with the yellow eel fisheries, I suspect they feel the same. I expect this motion to get modified perhaps significantly, but at least it is a start.

EXECUTIVE DIRECTOR BEAL: Other comments on the motion? I think everybody is talked out. Rob O'Reilly.

MR. O'REILLY: I'm just wondering about the quota management. Earlier we heard a little bit about limited entry. That would be something that I would hope there would be more discussion on, because limited entry is a big step. I think quota management might be a big

step for some states as there were earlier indications about how difficult it is with each new species that is under a quota.

I would also ask in terms of quota management; is it possible in thinking about what has been done so far by the working group; that instead of a quota, that there is a cap. We have a situation where the overfished/overfishing aspect is not there. It is a depleted situation coming out of the stock assessment.

There were some ideas I guess from the reports we read that the landings have been increasing. I think really in looking at all the data, probably by 2012; 2012 actually dipped back down coastwide to about where it was in 2010. It was only 2011 which showed an increase up to about 1.2 million pounds, which is very similar to what it was in 2003. I think there might be the possibility, given everything that has been discussed; that this could lend itself to a situation of a cap with a trigger rather than another quota until we have more information.

I think not having anything beyond 2010 for abundance in other parts of stock status makes it a possibility for a cap. You might remember for weakfish it was a great idea to have a cap for weakfish in 2007 with a trigger. It was a coast-wide cap with individual states having a share of what they already had historically with their landings.

The problem with weakfish was weakfish was declining as the cap was set and declined further. I don't sense that with American eel. That is just a suggestion, and I don't know if the working group would be able to look at such a situation as well on the quota.

EXECUTIVE DIRECTOR BEAL: The working group did go round and round and had a lot of conversation on cap versus quota and how those would operate. If the board wants to include options on quotas and on caps; I think the Plan Development Team is going to need specific guidance on what is the difference between a cap and a quota and how a cap with triggers would operate.

If that is the will of the group, I think we're going to need some more guidance for the Plan Development Team as that moves forward. I've got a number of folks here. I think in the interest of time, given that we only have an hour, I'm going to try to limit speakers to one comment per person on each motion.

Then we'll probably even move into the one comment in favor, one comment against motions to move these forward as quickly as possible. If the board feels that is severely cutting off the dialogue that is necessary, let me know, but I think it is a much more efficient way to move through this. We've had a lot of dialogue already this morning. I've got Ritchie then Doug then Louis.

MR. WHITE: I am going to make a motion to substitute. I've struggled with this decision. I am concerned about tying the glass eel and yellow eel issues together. **My motion to substitute is to remove Section 4.1.1 from Addendum III, and task staff to prepare a new addendum to include but not limited to the following:**

Coast-wide quota -- I put in 5,300 pounds, but that is just a starting point for discussion -- 5,300 pounds allocated equally between all the states; adequate monitoring requirements; adequate enforcement measures and penalties; transferability; timely reporting. If I get a second, I would like to speak to it, Mr. Chairman.

EXECUTIVE DIRECTOR BEAL: Is there a second to the motion? Dr. Daniel. Go ahead, Ritchie.

MR. WHITE: The 5,300 pounds comes from the 1999 to 2010 harvest levels. I believe that is the area in which the technical committee has recommended, but that is certainly open for adjustment. We finished a vision statement for the commission yesterday and the ink is barely dry. In that we said a fair allocation of marine fisheries. I think this addresses the fair allocation of this fishery. Thank you.

EXECUTIVE DIRECTOR BEAL: Louis, as seconder, do you have comments on this?

DR. DANIEL: I'll go ahead and make my comments, because it does pertain to this, and then you can cross me off your list. I definitely think we need this addendum in whatever form it takes, because this is new information that we need to go back to the public on. I support the addendum.

I do think we need to include in there some honoring of our aquaculture commitment from the 2000 plan. I think there are tremendous potential benefits of the aquaculture operations and the opportunities for aquaculture. I would like to see -- and this doesn't need to change the motion unless there is a lot of consternation.

But as one of the options in the glass eel fishery, having a provision in there that if we don't have a full-blown, just open every state as a glass eel fishery; if you have a bona fide brick-and-mortar aquaculture facility, to provide some special circumstances to provide them with that competitive edge that they need in order to compete with the Asian markets. I think that is something that we all should be supportive of. That was just an option.

The last comment I would make is -- and the reason I seconded this motion is I think it is absolutely critical that we include discussions on the potential ESA listing of this species, and make dangd sure that whatever we do, we're not increasing mortality. That is critical, because I think this could stir up a hornets' nest with those folks making the decision on listing. If we go out and say we're just going to have a wholesale open fishery, then we could end up back here in a year or two and we're just implementing the moratorium as required by ESA.

MR. GROUT: Even though Ritchie and I are from the same state, sometimes we do have differing thoughts on things. I will state now that this substitute motion has been put forward; that I do support the substitute motion. I understand where Terry was coming from with this, but I had some concerns with some of the

recommendations that came out of the working group.

I also felt within our existing draft addendum we had options for yellow eels that I think we can move forward with here. I am ready to make motions to that effect. Lumping that in with the glass eels; I knew we have differences of opinion on where we should go with glass eels. I can understand where we might need to have a different addendum to deal specifically with them.

The specific problems that I had with the working group recommendations were some of the recommendations to include the most recent years. They clearly go against what our Stock Assessment Subcommittee recommendations were; that the stock assessment terminal year was 2010. Their recommendations were based on the assessment of the resource at 2010; that we needed to reduce the harvest in all life stages from that point.

Including 2012 in their results in increase in harvest; particularly for including the time series for elvers. It includes it substantially so that we would end up with quotas that were 30 percent, 50 percent higher depending on which averages you have over what was actually being landed in 2010 or some average for that. I think that this board, when we develop whatever plans we have, I think we need to stick to what our stock assessment has recommended; that we're reducing from the point of some average with the last year of data being included in the time series being 2010. That being said I support this motion, and thank you very much for the opportunity to speak.

EXECUTIVE DIRECTOR BEAL: Reading between the lines, I think where folks are around the table; and correct me if I'm wrong, it seems to be an agreement that the board is going to want to start an addendum following this meeting. It sounds like folks want to take some of the pieces of Addendum III and approve those today.

It also sounds like there is going to be a debate on what to include in Addendum IV. I think

these two motions, the main motion and the substitute, are starting that debate on what to include in Addendum IV. I think we should vote on these maybe with the understanding that after we tackle all the Addendum III issues, we can come back and flush out the list of items that can be included in Addendum IV rather than debating all the potential options to include in Addendum IV.

Maybe we can make that the last part of the discussion if folks are comfortable with that. In order to do that, I think we should dispense of the motions that are here, vote them up or down and go from there. With that, I had Mitch, then Leroy, Steve and Russ on my list. Some of those names were on from the main motion, but let's try to keep the comments on the substitute motion for now.

MR. FEIGENBAUM: First of all, I support your idea that I think it would be most expeditious if we moved to have some motions addressing the items in Addendum III -- what Terry characterized as low-hanging fruit -- and then come back to what the different options should be for the Addendum IV. I think that is the better approach, and I commend you for suggesting it.

I just wanted to comment also very briefly about the aquaculture issue that has sort of come out of nowhere today and dominated an awful lot of the conversation. Under the working group proposals that presumably will be at least considered in Addendum IV, we're talking about the possibility of allowing other states to have some glass eel quota. We're going to debate that. We're going to make a good decision. We're going to have some science and we're going to go back and forth.

Then we're going to decide if other states can get into the glass eel business, and if so, under what conditions. At that point any company that has an eel farm or any other interest in aquaculture or glass eels needs to go to their states and make petitions and lobby their governments and advocate for their position to get a share of that state's quota.

I find in all my experience coming to ASMFC meetings for the better part of the past decade, I've never seen a situation where an individual company would come into the board and say we would like the board to give our company quota. Maybe it has happened; I've just never seen it. I would like to suggest that any further discussion about aquaculture be conducted in the context of whether states should be allowed to expand into the glass eel business. Because if we're going to go the other route, which is individual companies come in and ask for quota, then most assuredly that has to be done through a proper procedure; not just show up on a day of a meeting and ask for quota. I know there are a lot of folks out there who will be on that line. Thank you.

MR. LEROY YOUNG: One of the things that I'm thinking about relative to a new addendum is to include the idea – and I just throw this out for consideration – but to incentivize improvements in habitat, linking that to any new glass eel fisheries. We do this with all kinds of mitigation, and I think probably all of you do this in your states where, say, there is a development and there is a wetland impact and there has to be mitigation of maybe twice that replacement.

But if we linked that same idea to the glass eel fishery; say a state wanted to take a certain percentage, some kind of take on a stream in their state; to incentivize that by requiring improved habitat of a certain percentage. There is money out there for this. There is a lot of interest, there are grants available. A lot of the states here I think had some success in dam removals and those kinds of things. I think that would be a way to really address this habitat issue in part and link that with this interest in these glass eel fisheries in some of the other states.

MR. TRAIN: I am going to speak in favor of the substitute motion with one exception. I am having trouble with the portion that says of 5,300 pounds allocated equally between all states. I don't believe that is reflective of the current state of the fishery nor the increased effort that would happen with opening a fishery

in other states. I don't know if it is appropriate to make an amendment to a substitute motion or not, but if it is I would like to make one.

EXECUTIVE DIRECTOR BEAL: I think you can do that. I think you can go down three levels essentially so you can amend a substitute.

MR. TRAIN: **At this point I move to amend the substitute motion to remove “of 5,300 pounds allocated equally between all states” and leave the remaining text.**

EXECUTIVE DIRECTOR BEAL: Is there a second to that? David Simpson. I've got a list of speakers, but that list was back when the previous motion was up. Let's focus strictly on this motion to amend the substitute, which is striking those half a dozen words or so that take out 5,300 pounds in allocation. Comments on this motion? I've got Bill McElroy.

MR. WILLIAM A. McELROY: I would like to speak in support of that motion. My idea is that to give an equal allocation at this point is certainly doing a disservice to the state of Maine. In my opinion, I don't believe they've done anything wrong by having a fishery that was legal and properly developed. It seems a little harsh to give them one-fifteenth of what they used to have, so I support the motion.

MR. O'REILLY: Yes, I support the idea that this helps everyone come to the idea of what should be equivalency at some point. But at the same time, the 5,300, I'm not sure of the basis for that. I know we can't go a forth level, but I'm not sure why that has to be in there and why it wasn't enough just to have the idea that this could open up the opportunity for other states without setting a specified amount that doesn't seem to track more than the 1998 to 2010 average perhaps is what this was based on. That is a little bit of a sticking point for me, having the 5,300 in there now. It may turn out that with further analysis that would be higher or even lower; I don't know.

MR. ARCHAMBAULT: Again, we would have some serious concern with this motion. I fall back to the technical committee's

recommendation that we particularly be conservative with the young of the year fisheries. At this point in time opening up a coast-wide fishery is not what the technical committee is suggesting and could have some serious impacts down the road on future recruitment.

Again, we seem to keep coming back to a couple of good year classes where we've had some good recruitment. But, again, to base that on two good year classes from what we know on fish recruitment is a little bit on the skeptical side. Again, we would have some serious concerns with expanding this fishery. Thank you.

EXECUTIVE DIRECTOR BEAL: Other comments on this motion to amend? Tom Fote, I haven't heard from you yet.

MR. FOTE: I'm concerned removing the 5,300 pounds out of this. We basically talked about looking at not increasing the harvest. If you take it out, then you are increasing the harvest. Why do we use 2010? That is when the stock assessment period of time is for, and that is what we've used as figures.

The other thing is if we basically keep to a formula we're going through, you've got to do a three-year life study before you can open up any of your glass eel fisheries in any other states. We'll have three years to look at this and we can change the quota right after three years either up or down.

This fishery sometimes is a boom or bust. I remember the long battle we had in New Jersey where they had a glass eel fishery. Basically the year that the bill finally died, the market had dropped off completely, and it was worth \$30.00 a pound, and we were going to charge a thousand dollars for the permit.

We're talking about three years of a life study before you do anything. It basically gives us plenty of time to increase the quota if the current trend stays in place. I feel at this time we can at least put some mark in to basically – you know, we're going for endangered species, people are

pushing for that. At least we're saying we're not going to increase the harvest on young of the year, and it won't happen for at least three years, you know what I'm saying, and that is my concern.

MR. ABBOTT: To Bill's comment about increasing the number, I think if people might be interested in not seeing a glass eel fishery, it might sway the Service into making a decision that you would be more likely to advocate. I like the 5,300 pound number simply because the technical committee told us we shouldn't be increasing the number. We initially came here with the possibility of having a moratorium or having a reduction. I think that starting with this number is a much better idea than not having a number.

MR. MILLER: As I read the proposed amendment, it would strike 5,300 pounds so all that is left then in the substitute motion would be to remove Section 4.1.1, the glass eel fishery from the addendum and task staff to prepare a new addendum. The rest of what follows are things that probably no one would argue about; outlining adequate enforcement, transferability, timely reporting, et cetera. That is all it does. It doesn't do anything with regard to yellow eel. That issue would still have to be dealt with. I just wanted to make sure that I understood what the intent of the amendment and the substitute motion is. Thank you.

EXECUTIVE DIRECTOR BEAL: Well, I think the intent of the motion to amend and the motion to substitute are to limit the scope of the new addendum to the glass eel fishery and handle the yellow eel fishery through Addendum III, and silver eel and recreational would be handled under Addendum III that is in front of the board today. Other comments on the motion to amend? Doug, go ahead.

MR. GROUT: Just a comment from my standpoint. I didn't have a problem with removing the 5,300 because we could determine a different level; but allocated between all states, when you take that part out, it just means there will be a coast-wide glass eel quota. We essentially have that and it doesn't say anything

about developing any kind of a fishery, having the opportunity for other states to develop some kind of a fishery in here. For that reason, I oppose the amendment.

MR. ABBOTT: Further reading of Ritchie's motion; 5,300 pounds allocated equally between the states I think gets to Mr. McElroy's issue of thinking that New Hampshire would get one-fifteenth and Rhode Island would get one-fifteenth. I don't think that is the intent of Ritchie's motion. That is what it does say, but I would ask Ritchie White.

EXECUTIVE DIRECTOR BEAL: Ritchie, can you clarify that?

MR. WHITE: Well, that was my intent with thinking that some state directors have already told me that they are not going to have a fishery; so with the transferability piece in there; that obviously some states will have more than one-fifteenth, because a number of states won't be doing it, and therefore probably there will be the ability to transfer that quota to other states.

EXECUTIVE DIRECTOR BEAL: But, Ritchie, under this scenario your initial allocation would be essentially one-fifteenth of the 5,300, and then states would make the decision whether to transfer that or not to other states?

MR. WHITE: That is correct.

MR. SIMPSON: Yes, the reason I seconded the motion is twofold. One is because I think to support your idea for moving forward, less specificity now will help. What you were recommending, which I think makes sense, is the substitute motion says let's set glass eel management aside for the moment.

Let's get back to Addendum III, work out the details; and whatever is left, then we could finish off or perfect the motion to start Addendum IV. That is why I seconded the motion in large part, and also it was just a little more specificity than I think we're ready for right at this particular moment.

MR. ADLER: Yes, this whole thing is just to put that line into an Addendum IV. This isn't a final decision on that; it is to put it into Addendum IV for comment, right or not?

EXECUTIVE DIRECTOR BEAL: Yes, that is correct, absolutely. Dr. Daniel.

DR. DANIEL: That is my understanding, too, and that is why I don't object to the amendment. I would expect that in the fleshed-out amendment or addendum, whatever it is; that it would have various options for reducing harvest in the glass eel fishery consistent with the plan. The one point of clarification I wanted to make though is that I don't know that there is a three-year study requirement that is sacrosanct at this particular point in time.

I want to make sure I have plenty of opportunity to argue about that because we need to get moving fairly quickly on this. We've got folks that have come through the process and recognized that it is this decision of this commission that is going to make or break their operation. They are holding out, and I think waiting three years is just not reasonable or prudent with the situation that we find ourselves in.

EXECUTIVE DIRECTOR BEAL: Thank you, Louis, and the notion of the three-year survey period is included in the monitoring committee recommendations. It is not part of Addendum III, so that would have to go back out for public comment. Are there any other comments on motion to amend striking those words from the motion to substitute? Yes, Paul.

MR. DIODATI: Just a point of clarification; if the amended motion passes and strikes that language, it doesn't mean that the new addendum won't include as an option setting a 5,300 pound quota to be allocated anyway amongst the states.

EXECUTIVE DIRECTOR BEAL: That is correct; and I think my idea earlier was to move forward with a basic list and the notion that Addendum IV would be developed; and then following the Addendum III discussion, go back

and decide if there are other options that should be included. With that, are folks ready to caucus on the motion to amend? All right, I'll read it in; I think it is clear; the very bottom motion.

You are about to vote on the motion that reads move to amend to strike 5,300 pounds allocated equally between all states. All right, it looks like caucuses are wrapping up. Those in favor of motion to amend; please raise your right hand; those in opposition same sign, two in opposition; abstentions; any null votes. **Seeing none; the motion carries. The motion carries 16 to 2.** Now that the change is made to the motion to substitute, are there any other comments on the motion to substitute once that change is made? Russ.

MR. RUSS ALLEN: Thank you Mr. Chairman. I go back to your comments earlier. I think we're just playing with words here. I would have loved to see us work on Addendum III first before we're talking about Addendum IV. I think the yellow eel and glass eel situations are complementary, if not convoluted, and it is really hard.

I can see us easily accepting a nine-inch size limit and a half by half mesh and things of that nature. But the yellow eel quota may make – depending on what we do with that is going to make a big difference in what our thought process is in Addendum IV for glass eels. I'm at this point against the move to substitute. Thank you.

EXECUTIVE DIRECTOR BEAL: Are there any other comments on the motion to substitute?

MR. WHITE: Mr. Chairman, if this passes and we go back and work through issues in Addendum III and find that there are issues that need to be included in this; there is nothing that stops us from adding additional issues to this later in the day.

EXECUTIVE DIRECTOR BEAL: That is correct; the board has the ability to add options and issues to Addendum IV at any time since it hasn't even been drafted yet.

REPRESENTATIVE WALTER KUMIEGA: I think that is why I'm opposed to this substitute motion, because those issues are in the original motion. I don't think we're going to get through yellow eel quota today, so I think that should be part of Addendum IV.

EXECUTIVE DIRECTOR BEAL: Other comments. **Are folks ready to vote on the motion to substitute? I will read the motion in while caucuses are going on just so the record is clear; Move to substitute to remove Section 4.1.1, the glass eel fishery, from Addendum III, and task staff to prepare a new addendum including but not limited to the following:**

Issue one, coast-wide glass eel quota; Issue two, outline adequate monitoring requirement; Issue three; outline adequate enforcement measures and penalties; Issue four, transferability; Issue five, timely reporting. Motion by Mr. White; second by Dr. Daniel.

All those in favor of the motion to substitute please raise your right hand; those opposed like sign; any abstentions; null votes? **The motion carries 14 votes in favor; 4 in opposition. Now this becomes our main motion.** Is there any need for discussion? I hope not. All right, seeing no hands, is there a need to caucus? Folks are shaking their head no.

Those in favor of the main motion, please raise your right hand; those opposed like sign; abstentions; null votes. **The motion carries 14 votes in favor; 4 in opposition.** I think that brings us to the point where we're going to start tackling, according to Terry, low hanging fruit, so let's go into Addendum III, tackle some of the issues that are hopefully relatively straightforward and then we'll move back to this addendum if we need to. Mr. Diodati.

MR. DIODATI: I just wanted to respond or comment to remarks made earlier before we get another motion on the table; so while the table is open. It has got to do with the aquaculture discussion that was brought to us today. It is an

issue that I am not as familiar with as I should be.

I'm glad that I heard it today, and I think it was appropriate to bring that issue before the board, because I think with this fishery we're facing a very unique situation. In fact, we have significant precedent in federal law that protects American interests in the United States when it comes to allocating quotas.

What those laws do is that it makes sure that quota is allocated first and foremost to American companies. What we have here is a situation where this product is being sold in Asian markets. Certainly, it is probably being sold by American businesses, but the product is entirely exported, and I'm talking about the glass eel fishery.

What we have is a company that has established itself through significant investment, and it cannot survive without the input of glass eel. There has to be some production of glass eels for these companies. If we're going to nurture them, they have to have that. It is not possible for these companies to compete with these Asian markets. All of this product is being exported. I am glad that that issue was brought before me and educated me. I think it is something for us to consider; and whether or not we might want to in this allocation scheme that we're going to talk about in Addendum IV; we might want to consider domestic allocation of a glass eel portion of the quota.

EXECUTIVE DIRECTOR BEAL: That's a good idea, Paul; keep that in mind when we get back to Addendum IV in the list of options. I think it is reasonable.

DR. DANIEL: I just want to say I agree with everything he said.

EXECUTIVE DIRECTOR BEAL: Paul, you've already got support. You are on your way and you don't even have a motion yet. Is there another hand down at that end of the table? All right, motions on Amendment 3; let's jump into those and hopefully we can move through a number of these fairly quickly. Doug.

MR. GROUT: **I have a motion to address the yellow eel fishery under Section 4.1.2. My motion is to adopt Option 2 under Section 4.1.2, increase the minimum size specifically to 9 inches.** Then would you like to take these individually, because I'm going to also offer a gear restriction option.

EXECUTIVE DIRECTOR BEAL: I think we can do that together; they're linked.

MR. GROUT: **Okay; then under Option 3, gear restrictions; I would move adoption of Sub- Option 3B, a three-quarter by one-half inch minimum mesh size. Then under Option 5, I think it is – yes, I would also move adoption of Option 5, reporting requirements that would require states and jurisdictions with commercial yellow eel fisheries to implement trip level ticket systems for dealer and harvest reporting.** That is my motion.

EXECUTIVE DIRECTOR BEAL: Thank you Doug. Is there a second to that motion, as we get it up on the board? Bill McElroy seconds that. There are three distinct portions of the motion. Hopefully, we can keep them together and vote on that as one without a motion to separate the question. Comments on the motion? John.

MR. CLARK: I thought we had been discussing, especially in the working group, half by half as the minimum mesh size and not three-quarter by half. Can we put a motion up to change that to half by half?

EXECUTIVE DIRECTOR BEAL: Let's see if Doug is willing to consider that. If not, we can definitely make a motion to amend.

MR. GROUT: I'm sorry, I didn't hear what the requirement was because I was trying to make sure staff had the correct motion up there. What was the suggestion?

EXECUTIVE DIRECTOR BEAL: John Clark asked the question; the working group was recommending that the gear modification or gear restriction be a mesh of one-half inch by one-half inch rather than the three-quarter by one-

half that you had, and we were just checking if you wanted to endorse the working group recommendation or maintain the wording you have on the board.

MR. GROUT: My intent was this particular mesh requirement because it is an option that went out to public hearing. The working group requirement, I hadn't seen any analysis or comments by the technical committee or Stock Assessment Subcommittee as to whether that was an appropriate mesh size to be able to use. I am going to go with this. If the technical committee has a formal report that says one-half by one-half does it, then I am fine with it.

MR. CHASE: The one-half by one-half was most associated with a nine-inch minimum size, whereas the three-quarter by one-half would allow more escapements of 10- and 11-inch eels, which I think some jurisdictions were uncomfortable with.

MR. GROUT: Okay, then I would be willing to make it one-half by one-half if that is appropriate. I assume having status quo – and is this between status quo and the three-quarter by one-half if we went one-half by one-half?

EXECUTIVE DIRECTOR BEAL: That is the opinion of the working group; that is between those. That was discussed quite a bit on some of the conference calls so they were comfortable with that. Bill McElroy, you seconded that. Are you comfortable with that change? Okay, comments on the motion now. David Simpson.

MR. SIMPSON: Doug, I guess since it is your motion; I'm a little concerned about the reporting requirement trip ticket system sort of thing for eels. It wouldn't fit in our model of dealer reporting, because most of this would not go through a seafood dealer but would go through maybe a bait dealer, and those folks aren't even in our statutes. We would have to work with Inland Fisheries.

They don't have any kind of reporting requirements that all the other species we talk about do. I'm not sure how that will work in practice. I don't know if others have that same

issue, but this might be some kid selling eels to the tackle shop. They wouldn't be in our dealer reporting system.

MR. GILMORE: Yes, I have the same concern as Dave brought up. I mean we'd be in the same situation. We don't really have that. We've got a freshwater and a saltwater one we're now putting a burden on.

MR. GROUT: Clearly, this was an option that we approved to go out to public hearing. If those concerns were something that you had at that particular point in time, we probably should have included a different option than this and maybe added a sixth option about reporting requirements. I assumed since this board approved this option for public hearing without any other option for reporting, other than status quo, and we're trying to improve the reporting system for this; that this would be an appropriate system.

I know for my 99 pounds of eels that we land every year, we could comply with this with our reporting system, because we have both a fishery and then anybody that would sell we would just have to require the dealers to report it to us. That is my motion with this. If you have other ideas that may improve the reporting system, you can make an amendment.

MR. NOWALSKY: The working group recommendation for the Option 5 was tied to if a quota-based management program was implemented. Since we're not at that point yet with this motion, **I'm going to move to amend this to remove Option 5 for trip level reporting requirements.**

EXECUTIVE DIRECTOR BEAL: Is there a second to the motion to remove the reporting requirement segment? Jim Gilmore. All right, so now let's focus our conversation just on the motion to amend, which is to strike that portion of the main motion. Adam.

MR. NOWALSKY: I just want to be clear, Mr. Chairman, as the discussion moves through the day; that is not to remove the reporting requirements entirely. We get to a point where

we discuss quota management today or a future addendum; this intent is not to strike it forever.

MR. GROUT: I'm going to speak against this motion because I think one of the things that we oftentimes are looking for if we decide to go to quota management is what have our landings actually been? If we don't start improving our commercial and recreational landings data collection system, it is going to make the determination of what the quota should be a little bit more uncertain.

What I'm trying to do here is to let's get ahead of the curve; let's put in these basic measures that may reduce harvest a slight amount. Then if we decide in the future we have a need for a quota on yellow eels, then we will have good high-quality data to base those quotas on. Have it in place ahead of time; let's not wait until it happens.

MR. O'REILLY: I'm not sure this will help, but on the reporting I guess it depends on how things are reported. If there is not a federal report somewhere under SAFIS, then this would be a pretty daunting task probably for some states right now.

EXECUTIVE DIRECTOR BEAL: Other comments on the motion to amend? Seeing none; is there need to caucus? It doesn't look like it. All those in favor of the motion to amend, please raise your right hand; those opposed like sign. Somehow we gained a vote in that. Somebody voted twice or did something. Somebody is up to something. No; let's try that vote again. Those in favor of the motion to amend, please raise your right hand now and high; all right, now those opposed like sign. **The motion fails on a lack of majority, 9 to 9. The main motion remains as it originally was stated by Mr. Grout.** Mitch.

MR. FEIGENBAUM: Doug, maybe I'm addressing this to you, and perhaps you can address the issue. I don't want to make a friendly amendment, but maybe you can tweak the words. As I recall, the technical committee has said that the half by half mesh; the cutoff what kind of eel the half by half mesh is going to

retain goes all the way down to like 8.5 or 8.75 inches if I'm not mistaken.

I think we talked at the working group that if we were trying to accomplish the nine inches by the half by half, we're still going to have this little bit of overlap where some smaller eels are going to come in. Since the group has not endorsed the idea of half by three-quarters, which would have eliminated that problem, the alternative seems to me that there has to be at least some kind of a tolerance in place.

It is a fact; the half by half will still be retaining some eels under 9 inches, and law enforcement has told us repeatedly that they do not want to measure eels. They want to enforce size limits through the gear requirement. It is a little bit of a sticky wicket, but I don't know if there is a precedent for what is an appropriate tolerance. Let me just add that I did think that the half by three-quarters, along with the 9 inches, might have been the better solution, but I understand that is not the will of the board. Thank you.

MR. O'REILLY: I was just going to ask; I know the working group didn't cover everything, but it goes back to 1998 when we implemented the half inch by half inch, but at the same time there is an escape panel in eel pots of a half inch by one inch; four inches by four inches if it is square or rectangular.

I was wondering if that even came up with the work group or with the subcommittee in any way; and if it could at least get some public comment out there, it might address some of this tolerance issue. It certainly had a pretty good effect for our harvesters.

EXECUTIVE DIRECTOR BEAL: Rob, if I remember right, the working group had a description of everyone's gear requirement, including Virginia's escape panel. But the working group did not spend a lot of time talking about escape panels or the specifics of Virginia's setup.

MR. O'REILLY: May I follow up? Does that mean it might be worthwhile to get some information out there about it and see how this

goes? I mean it is good that everyone is going to be at least looking at the half inch by half inch, but the escape panel is probably an important component as well.

EXECUTIVE DIRECTOR BEAL: Are you suggesting potentially including that in Addendum IV for additional comment and not deciding on the gear now or a different course of action?

MR. O'REILLY: I think if I say go to Addendum IV, it probably will not meet with approval here. I'm just wondering if that can be included as a friendly amendment somehow in this motion.

MR. GROUT: Rob, maybe I'm misunderstanding what you're saying; but if you're saying that you want to have the option of adding in a half inch by one inch escape panel, to me that is more conservative than this option that we may be approving; and so that any state could put that in as more conservative. Are you saying that we do that escape panel instead of the half by half? I'm a little bit confused.

MR. O'REILLY: No, it is in combination, Doug. I guess when you look at the table of what is expected to go to a 9-inch minimum size limit, the savings are rather small. I would think the comments also about you are still going to have eels under 9 inches with the half inch by half inch that Mitchell raised; that is one of the reasons why the escape panel was utilized in Virginia.

It is a four inch square; it is a half inch by one inch. I think it would just add benefit, because there aren't that many states that have significant landings that aren't near the half inch by half inch New Jersey is under right now. There will be some savings there, I would imagine, but in the table it is listed as zero percent savings. The escape panel is just another mechanism that affords conservation, and it would be in combination with the half inch by half inch.

MR. CLARK: I just want to say as a state with a substantial bait eel fishery that we think the 9-

inch minimum is adequate and will also allow that fishery to continue. Thanks.

EXECUTIVE DIRECTOR BEAL: Rob, back to your point, Addendum III, when it went out for public comment last time, did not contemplate the use of an escape panel of larger mesh size than the mesh requirement. In other words, the Addendum III language says that if the board changes the mesh size of a pot, then the new mesh size could be used for three years while people convert over.

Like I think Maryland has a three-sixteenths inch mesh size and Maryland could require their fishermen to implement a half inch by half inch panel during that transitional period, but it did not contemplate the use of an escape panel with bigger mesh size to allow the larger eels to escape. If the board wants to do that, I think that would require going back out for public comment for a larger escape panel. Go ahead Rob.

MR. O'REILLY: Well, I think I'll take Doug's advice there that it is more conservative and I hope other states will also heed that advice probably. I don't think it is necessary to go into Addendum IV. I think that is going to be challenging enough, but I think at least everyone is alerted, and I appreciate you looking that up with Kate to get the specifics on it.

MR. NOWALSKY: For those states like New Jersey and New Hampshire, Massachusetts, Rhode Island, Connecticut and Delaware that have a smaller mesh size right now, the working group had contemplated a phase-in period of three years and an escape panel during that three year phase-in period. What would be appropriate, it is my feeling that needs to be in there for our fishermen.

It would be cost prohibitive at this point to expect them to change over all their gear by the implementation date. I don't know whether that would be accepted as a friendly amendment; whether you would want to amend this at the time to include the option specifically to allow a half by half escape panel for a three year phase-

in period or whether you would prefer to have that as a subsequent motion.

EXECUTIVE DIRECTOR BEAL: The addendum already includes the language on using a four inch by four inch panel with the new half inch by half inch mesh, but the addendum doesn't specify a timeframe. I think the only additional piece of information we need to provide, Adam, would be the new timeframe since Addendum III does not include that.

As you're saying, there is a financial burden of switching gear right away. Over what time period is it fair for fishermen to be expected to fully change the body of their eel pots to the larger mesh? That would be the question for the board; the timeframe not the use of the panel.

MR. NOWALSKY: I would support the three-year period as per the working group recommendation.

EXECUTIVE DIRECTOR BEAL: Let's do this, Adam; let's handle this motion and then we'll come back to the timeframe in a subsequent motion if that is okay. All right, any other comments on the motion? Doug.

MR. GROUT: I apologize, Mr. Chairman, but a comment that was made by Mitch gave me pause in that he had indicated that there is going to be some retention of undersized eels with this half by half inch mesh. My original motion until we had the friendly was based on what is in the document. I agreed to amend it after Brad Chase's – the chairman's comment that that wouldn't – that it would be corresponding to a nine-inch minimum size.

I assume that meant that we wouldn't be catching any eels under 9 inches; because that is what I'm trying to do is just make this simple, address the law enforcement concerns. I guess I'd like to have Brad give me – is that the case; are we going to have some eels being retained that are less than 9 inches with a half by half?

MR. CHASE: The theoretical retention size would be 8.75 inches with a half by half, so there would be some. But I think the

committees felt that that was probably the best match for 9 inches was half by half. Mitch's comment, the three-quarter would obviously be a better conservation move, but I think it would release some eels in the 10-inch size range, and so there was some concerns about that.

MR. GROUT: Then I guess I would have to ask law enforcement. I have heard there is difficulty in measuring these things. I know there is, because I tried to measure these things when I was a biologist, but you really have to knock these things out. Is the mesh size really the thing that is going to deal with the enforcement? That is the thing you can enforce; can you enforce the 9-inch minimum size? Would there be any discretion that the enforcement would have if they happen to catch somebody with an 8.9 inch eel.

COLONEL JOSEPH FESSENDEN: Well, I was just talking to Marty about this a few minutes ago. The only way we really can do it is having a bucket of ice, which we're not going to have that on patrol. The other way is having a mesh bucket, having a bucket with the mesh over it and pouring the eels on that bucket and whatever falls through would be illegal.

It would be difficult to enforce. Right now, for example, in Maine we have a six-inch minimum size. We don't have to worry about measuring a six-inch eel. To me I would have the mesh size so small that there would be no way of catching that minimum size eel that you want. Do you understand that; do you get that? Maybe kind of figure that out. My recommendation would be to do that.

EXECUTIVE DIRECTOR BEAL: Marty, do you have a comment as well?

MR. BOUW: Yes, it also depends on when the eels are caught and how long they've been in the pots. If they've been in the pots for five days, yes, they've lost the weight. They shrink up. But if they've been just caught the day before, they have their belly's full, they will not come through that mesh. As me being responsible hauling 80 percent of those eels, I don't want to be picked up by him and slapped in handcuffs

because I've got 10 eels in my truck that are undersized. It is very hard what prospect it is.

EXECUTIVE DIRECTOR BEAL: Doug, do you have a follow up or a way out of the woods maybe?

MR. GROUT: I don't know if a way out of the woods, but would you be more comfortable with – the advisory panel person as a harvesters be more comfortable with a half inch by three-quarter mesh size?

EXECUTIVE DIRECTOR BEAL: Marty, do you have a comment?

MR. BOUW: It would make it more feasible, but it is a lot of cost to the fisherman, and I believe the pots are not done in three years. If you asked those fisherman that have 2 and 3,000 pots to change those pots over in three years, it is not going to happen. They wouldn't put the money into it. The market is not there for it and they would not put the money into it. In all fairness, you maybe should put in a tolerance of about 10 percent. That is being fair if you go with half by half.

EXECUTIVE DIRECTOR BEAL: All right, other comments. Jim Estes.

MR. JIM ESTES: If we implement a half inch by half inch escape panel, do we need to even mention anything about the size limit; because we're essentially doing that anyways and it seemed like that would take care of the problem.

EXECUTIVE DIRECTOR BEAL: That is another option. Pat Augustine.

MR. AUGUSTINE: I would suggest we go to a tolerance, and we've heard it from Joe and from Marty both, and you end up with a 10 percent tolerance. Is that high, Marty? You picked 10 percent out and here they mentioned a 1 percent tolerance in another part. Would 5 percent be more adequate? I don't want to split hairs, but let that create an enforcement issue when you're using half by half, if that is the way we go. What would you suggest?

MR. BOUW: I'm just taking them by myself. Looking at what you see, what we pick up, I think 10 percent is a high mark, but it at least keeps everybody safe. That stops the patrol splitting hairs, because that is where the problem is going to come. That is intolerance that the people that have fished that the day before; they still put them on the truck. They are not going to keep those eels separate for another five or six days.

EXECUTIVE DIRECTOR BEAL: All right, a couple ideas bouncing around, getting rid of the size limit, a tolerance. What do folks want to do? Doug.

MR. GROUT: Well, personally, I think having a tolerance makes enforcement much more complicated. It would just be much more simple if we are going to be effectively managing by a minimum mesh size to eliminate the minimum size limit from that. I would be willing to remove that part from my motion if the seconder is willing to agree, and just go by half inch by half inch.

I also, just to get out ahead of what may come up as a follow-up motion from some of these discussions, if we want to have a phase-in period, I certainly can understand the need for that. Hopefully, other states will also have the escape panels in there. If it is okay with the seconder, Mr. McElroy, can we remove the minimum size limit option so we're just going to say remove for Option 2, increasing the minimum size limit to 9 inches.

EXECUTIVE DIRECTOR BEAL: Let me check with the board. There has been a lot of discussion and a lot of debate on the 9-inch portion of this motion. Is anyone at the board not comfortable with pulling out the 9-inch minimum size; and if they are, we'll have to do this through a motion to amend. I do see some hands up. Dr. Daniel, do you have a comment?

DR. DANIEL: I would support it if that is going to give me my elver fishery. I'm assuming that is what that would do.

EXECUTIVE DIRECTOR BEAL: If you can keep them in a half inch by half inch pot, I think you're all set.

DR. DANIEL: It doesn't say that; it just says no size limit.

EXECUTIVE DIRECTOR BEAL: All right, is there a motion relative to the size limit issue?

MR. FOTE: I support putting a half inch by half inch in the commercial fishery and make that the requirement without a size limit, but again you're dealing with the recreational fishery, and you really need to keep a 9-inch size limit in the recreational fishery. We can all handle this differently. You have a gear modification that allows them only to catch a certain amount, but in the recreational fishery you should still have a 9-inch size limit.

MR. DIODATI: I think maybe there is a technical committee – some input on this. I guess the concern might be that if it is not in there, then this leads to the possible development of fisheries that are targeting eels below 9 inches, 6 inches, 7 inches, 8 inches and that becomes problematic. I think it belongs in there, but I would like the technical committee to say something about it.

MR. CHASE: Well, the technical committee and the SAS were looking for opportunities to reduce mortality in all fisheries, and we felt the size limit was one area to do that. We targeted sizes 10, 11, 12 inches that would lead to some small reductions in mortality. Through the negotiating processes we came back to 9 inches.

I think there is still a benefit there even though it is a slight benefit. The second benefit is the concern over development of new markets for those eels that are above glass eel size, the pigmented eels 5, 6, 7 inches that could be harvested. There is some evidence there are markets for those. That change would also reduce that incentive to have those new markets develop, which I think is important.

MR. AUGUSTINE: Based on the discussion, **I would like to move to amend to add a 5**

percent tolerance for enforcement purposes. I'm not sure what language you want to use, but to add a 5 percent tolerance. If this is going to reduce the amount of infractions, it makes sense, and Marty who has been in the business for 30 years or more knows this is going to happen with a half by half inch net.

Yet half by three-quarters is not going to cut it for us and 9 inches is the size we're trying to get to. I agree with Tom Fote, if somehow we can have a statement in here later when we get back to Amendment 3, that we add a minimum of 9 inches on the recreational side for retention purposes. We've got to have that control, because I know with those commercial fishermen – I mean, the charterboat folks, too; been there done that. I do think we have to close that loop. If we're going to try to reduce mortality, let's do it in a logical way that is going to make sense and is doable. Thank you.

EXECUTIVE DIRECTOR BEAL: Is there a second to the motion for a 5 percent tolerance? Steve Train; thank you. Pat, is this 5 percent tolerance by number of eels or by weight? I'm hearing number is a better way to go.

MR. AUGUSTINE: Is enforcement going to look at them visually or they're just going to say, yes, it looks like 5 percent. It is going to be visual, right?

COLONEL FESSENDEN: We're not going to have a scale so that makes it difficult with the weight. Marty is telling me weigh it here. No, we wouldn't have a scale with us and so number would be –

MR. AUGUSTINE: It would be just a look-see visual probably, my guess would be.

COLONEL FESSENDEN: It is easier to count them up.

MR. AUGUSTINE: That is the way we would have to do it, Bob. I don't know how we can handle it.

EXECUTIVE DIRECTOR BEAL: Pat is saying by number. Any comments on the 5 percent

tolerance in minimum size limit by number?
Louis.

DR. DANIEL: I'm sorry; I'm trying to make sure my head is wrapped around this properly, and I'm talking back here at the table. We're kind of confused about what does this do? You laugh, but the glass eel fishery, if there is a 5 percent tolerance, then that 5 percent could be glass eels, right? I don't believe this motion, if it is directed to the pot fishery only. But it says bycatch in the yellow. You could have a silver eel in there too, right? That is not illegal.

I'm just a little bit concerned about how this works. If it is an intent to move forward with an addendum or an amendment to address the glass eel fishery, I think this might muddy it up a little bit. If I'm alone on this concern, I will get over it, but I just want to make sure the board is clear and we're clear, the record is clear of the intent here and not have somebody take advantage of it in some way, shape or form.

EXECUTIVE DIRECTOR BEAL: I think this is for, as was said, the yellow eel fishery, and the enforcement folks would look at – and, Joe, correct me if I'm wrong – would look at the fact that the eels are retained by one-half by one-half inch mesh, but they happen to be somewhat smaller than 9 inches. They would still have to be retained by that mesh. If they fall through that mesh, then they would be illegal anyway. Is that right, Joe? Joe indicated yes. I think that helps with the elver issue. We've got a number of hands. Rob O'Reilly.

MR. O'REILLY: Yes, I just don't think this is necessary. I appreciate that it may help somewhere, but usually in a state law enforcement has discretion of some amount. They know where the problems are and they are going to find them, and I don't think complicating it with a tolerance is really the right thing to do. I did want to comment on the other motion, but I'll wait until my turn comes up.

EXECUTIVE DIRECTOR BEAL: Other comments on this 5 percent tolerance motion?

MR. ABBOTT: I'd like to oppose this motion also. Though I would enjoy watching Joe Fessenden count 500 eels looking for 5 percent tolerance, and I would more enjoy asking for a recount, and then I would further enjoy being in court when the judge asked you about your count and asked you at that point to make another count.

I think that we should leave this to the law enforcement people to either feel that they have enough of a problem to make a case or not. If there is no tolerance, then they make a case as they choose. I just don't think this is necessary nor should we be getting so wrapped around the axle to do this. I appreciate your motion, Pat, but I just don't think it is really necessary or serves a good purpose, but I would enjoy watching Joe count eels.

EXECUTIVE DIRECTOR BEAL: Steve Train as a seconder.

MR. TRAIN: Dennis, I had the same visual when I seconded it. I seconded this not so much for the 5 percent but to make sure the 9 inches stays in. I have a fear as a trap fisherman in another fishery that if you do not maintain a minimum size you; for lack of a better word, encourage the piracy of the undersized eels. Somebody will find a way to set a trap that will catch them and they will catch a lot of them.

I think Paul touched on that. You need to keep a minimum size in there not because of the trap requirements you are putting in are going to have too many of them, but because somebody will find a way around that and they will find a way to land the smaller ones. I thought the 5 percent might be a good balance. If we don't need it, we don't need it, but I would hate to see the minimum size leave.

EXECUTIVE DIRECTOR BEAL: Other comments on the 5 percent tolerance? Seeing none; is there need to caucus? It doesn't look like it. Those in favor of the motion to amend, which reads motion to amend to add 5 percent tolerance to a minimum size limit by number, please raise your right hand, those in favor; those in opposition same sign; any abstentions

or null votes, one null vote. **Motion fails; 4 votes in favor; 13 votes in opposition, and 1 null vote.**

I just looked at my watch. It is a little after noon, and the low-hanging fruit thing is not going real well. I think that brings us back to the main motion, which includes all the provisions from earlier. Are folks ready to vote on the main motion or is there anything else that needs to be discussed?

I don't see anything else; good. Need to caucus? Seeing none; those in favor of the main motion, please raise your right hand; those opposed; abstentions; null votes. That one carries unanimously. We have cleaned the slate. We have no motions on the board right now. Are there other motions on A ddendum III? Yes, Adam.

MR. NOWALSKY: Would now, Mr. Chairman, be appropriate for the motion? **I would move to have a three-year phase-in period for the minimum mesh size, during which time a four-inch square half by half inch mesh escape panel could be utilized.**

EXECUTIVE DIRECTOR BEAL: Is there a second to that motion? Jim Gilmore, thank you. Comments on the three-year phase in. Terry.

MR. STOCKWELL: I would just like some rationale Adam. That's an awful long time.

MR. NOWALSKY: We have fishermen in our state with a lot of gear where quite frankly to ask them in a one- or two-year time period, the financial expense of asking them to do it would probably drive them right out of the fishery.

MR. FOTE: Yes, we're not talking about a glass eel fishery where you're making \$230 a pound and we're not talking about a lobster fishery where you get good prices. This is a lot different fishery, and to make them go through the expense of exchanging 2,000 pots or 300 pots, it takes a bit of time, because these guys are basically just watermen and bay men that make a combine income basically crabbing,

clamming and potting for eels, so that is what I'm looking at.

EXECUTIVE DIRECTOR BEAL: A lso, the three years was recommended by the advisory panel and the working group. Ritchie, do you have a comment?

MR. WHITE: Yes, not knowing anything about an eel pot, what about location of that escape panel; does it make any difference?

MR. NOWALSKY: Well, obviously if the pot sets on the bottom, it is going to be an issue. At some point in time that pot does need to be raised vertically, which would present an opportunity for those eels at that time. Basically, when the pot is going to go down, though, a lot of the pots are weighted on one direction. However, there would be the possibility that they could go down with that on one of those sides.

MR. WHITE: I would like to ask the technical committee then if they would have a recommendation, if there should be a location or an area that the escape panel should not be located.

MR. CHASE: I would defer to the industry. I would think with those comments you would not want it to be on the bottom on one side; maybe on both sides midway up, but I defer to others.

MR. FOTE: I n my younger days, when I actually fished, I used to fish a lot of eels and pot a lot of eels and kept them in pens. You get a quarter-inch hole in the pen and they seem to get all out. I lost more eels from a small hole. There is no problem of them; as you pull them up you see them getting out of the pot if there is a hole big enough to get them out.

You are basically pulling them; they'll get out no matter what. You've got to understand the fishery and the fishery is as so on as you start lifting that pot, they are looking for some place to get out. Eels are very good about getting out of anything.

EXECUTIVE DIRECTOR BEAL: North Carolina and Virginia currently require escape panels. Does either of those states have details in your laws that could be borrowed by other states or is it not specific on where the panel should be?

MR. O'REILLY: If I may; what I was trying to explain to Doug earlier, if the pot itself is a half inch by half inch mesh; and then within the pot, if it is square or rectangular, it has one four-inch by four-inch escape panel, a half inch by an inch. That also works for cylindrical eel pots; you still have to have the four-inch square. It is not dedicated to the placement as such, but it is dedicated to the idea of that.

MR. NOWALSKY: From a reality perspective, it is going to be in a fisherman's best interest where it is going to work. Otherwise, it is going to result in a high likelihood of an enforcement violation. With no tolerance built in, the fisherman is likely to do everything in his power to make sure it is effective.

EXECUTIVE DIRECTOR BEAL: Any other comments on this three year phase-in idea? Seeing none; need to caucus? No; looks good. I'll read it into the record: move to have a three-year phase-in period for the minimum mesh size in which a four-inch square one-half inch by one-half inch mesh escape panel could be utilized.

All those in favor, raise your right hand, please, 16 in favor; opposed; like sign; abstentions; null votes. **The motion carries 16 votes in favor, 1 in opposition and 1 null vote.** Are there any other motions on Addendum III; the silver eel portion or recreational fisheries? Doug.

MR. GROUT: **I'm going to try and hit another low-hanging fruit here and go directly over to the recreational section, and move to adopt under Section 4.2, recreational fisheries, Options 2, the 25 fish per day angler creel limit; and Option 3, the exemption for party/charterboats.**

EXECUTIVE DIRECTOR BEAL: Is there a second to that motion? Bill Adler, thank you.

Comments on the motion for recreational management provisions? Yes, Walter.

REPRESENTATIVE KUMIEGA: Does that address the 9-inch minimum, or how is that addressed?

EXECUTIVE DIRECTOR BEAL: Doug did not include that in the motion. Doug.

MR. GROUT: To be honest, I didn't see under recreational measures something that went out to public hearing with a minimum size limit for recreational; or am I incorrect on that?

EXECUTIVE DIRECTOR BEAL: Kate, can you comment on that?

MS. TAYLOR: There is text in the document that says that there would be need for consistent size regulations between the commercial and recreational fisheries.

EXECUTIVE DIRECTOR BEAL: I think based on that wording, the board has the ability to include a minimum size for the recreational fishery. Doug.

MR. GROUT: My motion didn't include that; but if somebody wants to make an amendment, that is fine. I just find it kind of difficult to see how you could enforce a minimum size limit with recreational fisheries.

EXECUTIVE DIRECTOR BEAL: Let's see if folks want to either amend this motion or dispose of this one and then have a subsequent motion. Yes, David Simpson.

MR. SIMPSON: Yes, I'm a little trouble by the exemption for party and charterboats. I thought when we talked about this last time there was a decent understanding that this was a possession versus take issue. I don't think party and charterboats are out there catching eels. They are buying them and bringing them out with them. To provide an exemption here I think is just not necessary and can be dealt with in how the take versus possession rule is applied.

EXECUTIVE DIRECTOR BEAL: I think under Option 3; actually, Kate, it is probably better if she clarifies.

MS. TAYLOR: Option 3 just allows for the party and charterboats to maintain the current regulation that they are subject to under the FMP while the recreational fishermen would be subject to the 25-fish bag limit.

MR. SIMPSON: Right; so different rules for party and charterboats than everyone else on eels. **I'm going to move to amend to strike the Option 3, an exemption for party and charterboats.**

EXECUTIVE DIRECTOR BEAL: Is there a second to that motion? Stephen Train. All right, so now let's focus on that motion to amend, which removes the exemption for party and charter boats. Rick.

MR. RICK BELLAVANCE: I guess I recall it a little bit different, and maybe I could defer to Joe in regards to the enforcement part of this. I thought we had that discussion and there was no way to differentiate between harvest and possession, so that is why we went forward with the charterboat exemption for those folks that might be transiting areas with a large quantity of eels to pick up customers somewhere else. I think there was an enforcement issue there, but maybe you can clarify that, Joe.

COLONEL FESSENDEN: Yes, I agree that there should be a possession limit. I don't think we ought to get into proving take. It should be a strict possession limit. That is the easiest thing to enforce. We can enforce anything; but if you look at the success, we'd have a much higher success rate with possession.

MR. FEIGENBAUM: Well, I don't know how you could include an exemption for party charterboats and not one for commercial bait shops, because it is the exact same scenario. They are going to be possessing; they need more even in the boat to possess more than 25 at a time. If we don't take out the partyboat exemption, we need to add a bait shop exemption.

EXECUTIVE DIRECTOR BEAL: Well, I think the bait shops are covered. Once they purchase those eels, they are allowed to possess more than 25. It is not an individual recreational fisherman at that point; similar to a commercial dealer or anyone else possessing one.

MR. FEIGENBAUM: I don't see – I don't get it, okay.

MR. FOTE: There are 5,000 beach buggy permits for Allen Beach State Park. One guy will ride 50 miles to pick up eels for five or six people. He's picking up maybe 150 to 200 eels. He's got to have the purchase slip in his hand. If he gets stopped by law enforcement without that purchase slip, then he's in trouble. But probably now with gas prices and everything else, people look to pool their resources and this is what it's doing, because we went out and burned a lot of gas sending six people to pick up 25 eels when one guy can go pick up 150 eels for the six guys. That is what this accommodates; and as long as you have a proof of purchase, whether it is a partyboat or a charterboat or a private boat or a beach buggy, you are covered.

EXECUTIVE DIRECTOR BEAL: Other comments on the motion to amend by striking Option 3. Seeing no other comments; are folks ready to vote? Need to caucus? I will read the motion: move to amend to strike Option 3, an exemption for party and charterboats. All those in favor of the motion to amend, please raise your right hand; those opposed to the motion to amend please raise your right hand; abstentions; any null votes? **Motion fails; 4 votes in favor, 12 in opposition.**

Now we're back to the main motion. The wording of the main motion stays intact and there are no changes based on the motion to amend. Any comments on the main motion? Mitch.

MR. FEIGENBAUM: Well, there is still this issue on the table about unifying the recreational size limit and the commercial size limit. I heard Commissioner Grout suggest that if someone wanted to make that motion to do so, he wasn't going to make it. **I would like to make a**

motion that the size limit for recreational catch be uniform with the size limit for commercial catch, as has always been the case I believe in our fishery and was the recommendation I do believe of the working group.

EXECUTIVE DIRECTOR BEAL: **Mitch, that would be a motion to amend to add that to the main motion?**

MR. FEIGENBAUM: Yes.

EXECUTIVE DIRECTOR BEAL: All right, is there a second to the motion? Pat Augustine, thank you. Comments on the motion to amend, which would add a minimum size limit of 9 inches for the recreational fishery? Any comments? People are getting hungry and worn out, so we make some progress. Is there need to caucus? Mitch.

MR. FEIGENBAUM: Well, I'll just make the brief comment again if we think that raising the size limit is the right thing to do and we want to have consistent enforcement, I don't understand why we would have two separate size limits. Again, it has always been the case. The recreational size limit has been six and the commercial has been six. This would be a departure to not accept the motion.

EXECUTIVE DIRECTOR BEAL: I'll read the motion in while the states caucus: move to amend that the size limit for the recreational fishery matches the size limit for the commercial fishery. Those in favor of the motion to amend, please raise your right hand; any votes in opposition; abstentions; null votes. **The motion carries unanimously.**

That wording will be added to the main motion. Is there any need to discuss the main motion anymore? It doesn't look like it. All right, caucus on the main motion. I'll read the main motion here in a minute, once it is squared away. **The main motion reads move to adopt under Section 4.2 recreational fisheries Option 2, 25 fish per day creel limit; and Option 3, an exemption for party and charterboats; and the size limit for the recreational fishery**

matches the size limit for the commercial fishery. Is there a need to comment? Doesn't look like it; caucus? States in favor of the main motion, please raise your right hand; any votes in opposition; abstentions; null votes. **Seeing none; the motion carries unanimously.** Yes, sir, Pat.

MR. AUGUSTINE: **Mr. Chairman, move to approve Addendum III management options as amended today for final approval.**

EXECUTIVE DIRECTOR BEAL: Let me check if there are motions on the silver eel fishery before that. That is one of the issues that folks indicated they wanted to talk about. Are there motions regarding the silver eel fishery? Doug.

MR. GROUT: For the purposes of discussion for this board, I think we do need to discuss this, **so I'm going to make a motion for Section 4.1.3, silver eels fisheries, adopt Option 2, seasonal closure restrictions.**

EXECUTIVE DIRECTOR BEAL: Kate has one question, Doug, on that motion before I ask for a second, if that is okay.

MS. TAYLOR: I just wanted to clarify that you're looking to approve the language that was included in the public comment document and not the working group recommendations.

MR. GROUT: Correct.

EXECUTIVE DIRECTOR BEAL: Is there a second to that motion? Bill McElroy, thank you. Comments on the motion, which was; Option 2, seasonal closure for the silver eel fishery. Jim.

MR. GILMORE: You're killing me, Doug. This motion essentially would shut down the New York Weir Fishery in the Delaware, which was the recommendation that maybe there be essentially an exemption for that. If that was not included in what you were doing, **I will have to move to amend that we essentially adopt Section 4.13, for the silver fisheries adopt Option 2, season closure but exempt the Delaware Weir Fishery in New York.**

EXECUTIVE DIRECTOR BEAL: Is there a second to Jim's motion to exempt the Delaware River Weir Fishery in New York? Paul Diodati.

MR. DIODATI: Actually, I thought that the working group spoke about an exemption to allow spearfishing in that time period of September to December, and that accommodates some long-standing practices from some of the Native American groups in Massachusetts. I would like to see that in place. If we can put that in there as well, I will second the motion, I would be glad to.

MR. GILMORE: I'll gladly take that.

EXECUTIVE DIRECTOR BEAL: Sounds like a deal, Paul, so we'll get that in there. We'll add the exemption for spearfishing gear; and then that will be a motion by Jim Gilmore, seconded by Paul Diodati. Comments on the motion to amend? Ritchie.

MR. WHITE: Jim, I support this amendment. I guess my only concern is that it stays a minor fishery. I don't know if there is a way of you putting in some poundage or some sidebars or something such that this couldn't end up being a large fishery at some point and it would be exempted.

EXECUTIVE DIRECTOR BEAL: Jim, do you have a comment on that or do you want to hear what other folks have to say first?

MR. GILMORE: I wouldn't have an objection for doing that Ritchie. I don't know what that limit would be. I mean, we could base it on the historic landings and keep it at that, but we would have to develop that.

MR. ARCHAMBAULT: It would be helpful if New York could give us some idea on the size and the magnitude of this fishery. These are by far the most important eels we are trying to protect, so I'm trying to get a handle on what we're looking at for the size of this fishery.

MR. GILMORE: I don't have the exact numbers, but I think that in its heyday there were about 12 or 15 permits, and I think it is

down to 3 to 6. It is very, very small. I think the poundage is –I don't remember exactly what it is. Again, I would have to get those numbers, but it is a small fishery, and we could again base it on its current size so it wouldn't expand. Again, it was relatively small both in poundage and number of fishermen that were exploiting it.

MR. YOUNG: My question is how would this reduce mortality on silver eels? I don't understand how it would do that. I mean, is there a significant fishery in other states in that seasonal period? What is this actually doing?

EXECUTIVE DIRECTOR BEAL: We'll get back to that, Leroy. Mitch.

MR. FEIGENBAUM: Yes, first I would like to address Leroy's question very briefly, and that is that there are a very few remaining pound nets along the coast that are potentially retaining silver eels. Nonetheless, the Delaware River Weir Fishery is clearly by far the largest and only really significant silver eel fishery in the U.S.

Keeping it at a status quo would pretty much mean silver eel harvesting is kept at its status quo. But at this point I would just like to point out to my fellow commissioners that Mari-Beth DeLucia is here. She is the Vice-Chairman of the AP. She sat in on every working group meeting and every AP meeting on this issue. She knows an awful lot about it, and if the Chair would indulge us if she could have a minute or two just to address this, because she really brings a lot of good information to the table.

EXECUTIVE DIRECTOR BEAL: Mari-Beth, if you could come up, that would be great if you could just kind of characterize the fishery and address some of the concerns about this fishery expanding, and what changes you would expect if this motion were to pass.

MS. MARI-BETH DELUCI: The fishery is definitely variable. It has been, as you said, up to six, but up to 12 fisheries. It is the only inland fishery, so it is taking all large female silver eels. I think that is what most people are

concerned about. I've personally spoken with multiple fishermen on this, and some years one eel weir has taken up to 11,000 fish out of one of the only rivers on the east coast that is not dammed, and it has some of the highest water quality. These are probably very healthy female silver eels.

At the last meeting we were at, there were some new young folks that wanted to get into this fishery because of prices that were increasing. I spoke to a DEC. fishery biologist 10 years ago who was intimately familiar with this fishery and he said, "Oh, in 10 years it will be gone." Well, it is two more years and the fishery actually seems to be getting more increase in pressure.

I work on the Neversink River in particular. Last year we had three more people that just wanted to start fishing these fish. It's not declining. It goes up and down with the years. It is taking all females. I think the working group came up with some reasonable recommendations that would protect some of the cultural aspects of this fishery for the next ten years, but not allow it to expand or grow and start reducing it down, and I think to decrease new fishermen from coming in.

EXECUTIVE DIRECTOR BEAL: Thank you Mari-Beth; sorry to put you on the spot like that.

MS, DELUCIA: Yes, thank you, Mitch.

EXECUTIVE DIRECTOR BEAL: Yes, thank Mitch and not me.

MR. FEIGENBAUM: Very briefly; 11 pounds nets, 110,000 eel – or 10,000 or 11,000 pounds per net would equal a silver eel fishery that could reach as much as 100,000 pounds a year. A hundred thousand pounds a year of silver eels would probably be the conservation equivalency of the entire glass eel fishery in North America. Brad would probably have a better idea of the numbers than me, but I'm quite sure I'm not too far off.

MR. FOTE: That PBS special on eels; is this the one that basically almost blocks off the

whole river; and basically everything that goes down, it takes everything coming out, all the eels basically for that two-month period? That to me is a problem. If you're basically removing every silver eel that is coming down a river – when I looked at this on television, it was amazing how much area, and it was really a funnel that stopped everything coming down for a two-month period. I've got concerns with this.

EXECUTIVE DIRECTOR BEAL: Jim, do you have a comment?

MR. GILMORE: Yes, first off going to Mitch's comment, I think we were down to six permits. I think there were only three nets fishing. Again, this is a real boom-or-bust fishery. It is heavily dependent upon atmospheric conditions in terms of rainfall, whatever, and essentially they get nothing some years.

The average is more like they are taking 1,000 to 3,000 on a good year. Those are more realistic numbers. Trying to say that this is equivalent to the glass eel fishery; that is just not right. Again, this is a small fishery. We're trying to maintain that historic and that classical existence of this fishery in inland waters.

If we want to limit this down or even suggest that we could go with try to phase this out in 10 years; but to totally eliminate this at this point in time, I think is incorrect. We would be willing very much to try to reduce it down to some reasonable number that the board feels comfortable with.

EXECUTIVE DIRECTOR BEAL: Well, it sounds like folks want to take a reduction, but they're not sure exactly what they are working with as far as poundage or number of gears.

MR. STOCKWELL: For all the tender loving care the elver fishery got this morning, I've got great concerns about the silver eel fishery. I've got a motion to substitute the working group's recommendation. It addresses the issue –

EXECUTIVE DIRECTOR BEAL: Terry, hang on. We've got a motion to amend, so are you substituting the motion to amend?

MR. STOCKWELL: I guess I'm waiting for lunch, too. I guess we vote this one up or down, but this doesn't do it for me. The working group spent a fair amount of time talking about this. I think the resolution might be in that recommendation.

EXECUTIVE DIRECTOR BEAL: Thank you Terry. Mitch, and then we're going to get ready to vote.

MR. FEIGENBAUM: I want to be clear to the good folks in New York that I do not support the working group's recommendation to phase it out completely in 10 years. I don't think it should be phased out ever, but I do think that there needs to be some reduction. Really these two options are leaving us or all or nothing, and it is precluding the middle.

Maybe we can come back to it after lunch and come up with the appropriate measures, which is the middle ground. There should be some reduction or cap in that fishery just like every other fishery is being asked to make a reduction or a cap. I'm sure we could work that out. I asked Mari-Beth to speak. That doesn't mean I agree with everything she said. I do not support a closure to shut it down. I was involved 10 years ago saying this is a little fishery and we shouldn't even be bothering with it, but now I feel we should do at least something.

MR. DIODATI: Yes, it is getting a little bit confusing as to what this amendment would achieve. I'm debating whether or not I want to try to separate out my change to allow spearfishing with it. If the amended motion fails, does that prevent me from bringing back the allowance for spearfishing?

EXECUTIVE DIRECTOR BEAL: In the interest of time, I'll say no. I think it is fair. If this motion were to fail and it is a motion to amend, you could bring back one portion of that motion in a subsequent motion. It sounds like Mr. Stockwell indicated that he may ask for consideration of the working group recommendations, which include the exemption for spearfishing.

MR. DIODATI: I guess it's not clear to me what the scope of this fishery is that we're debating, this particular weir fishery in New York. That seems to be the real issue. Until we understand the scope of that fishery, I know I am going to have trouble supporting a motion which I seconded.

MR. GROUT: Based on the considerable discussion that we've had over this, I have a suggestion here. Clearly, because we're down to an amendment, I would recommend that we vote this up or down, this motion to amend. Then at that point potentially have a substitute motion that we would address the silver eel fishery in Addendum IV.

Then we can try and work out some of these details in Addendum IV at that particular point rather than try and deal with it today. I don't know how the rest of the board feels about it, but given the amount of discussion I think it is something that would be appropriate for Addendum IV.

EXECUTIVE DIRECTOR BEAL: Does anyone have a concern with that suggestion? We'll vote on this motion to amend and see where it goes from there. All right seeing none; is there a need for caucus? **I'll read the motion into the record: move to amend for Section 4.1.3 for silver eel fisheries, to adopt Option 2, season closure; but exempt the Delaware River Weir Fishery in New York; and to allow for spearfishing gear.**

The motion is by Mr. Gilmore, seconded by Mr. Diodati. All those in favor of this motion, please raise your right hand; those opposed like sign; abstention; null votes. **Two votes in favor, 15 votes in opposition, the motion fails.** That brings us back to the main motion, and is there any interest to have a substitute as was suggested earlier? Doug.

MR. GROUT: Could I make a substitute motion to my own motion or should I get somebody else to do it?

EXECUTIVE DIRECTOR BEAL: It is probably better to have someone else do it. Mr. Stockwell.

MR. STOCKWELL: I've been very successful today so we'll see how this goes. **I move to amend or substitute, but it would be to move further consideration of silver eel fisheries into Addendum IV.**

EXECUTIVE DIRECTOR BEAL: Is there a second to that? Jim is seconding it. Dr. Daniel.

DR. DANIEL: I think we could do that. I would prefer though to take action for this upcoming – would we be able to action for this upcoming season if we did something today? That is my concern, is that we're talking about trying to make concessions in the fishery and we're trying to do some things with Addendum IV, but I don't know that we've really done a whole lot to reduce harvest in this amendment. With the ESA looming, it would probably be in our best interest to do a little more other than punting again.

EXECUTIVE DIRECTOR BEAL: Louis, the closure that is contemplated here would be September through December. Are you suggesting have something in place for this September or are you talking 2014?

DR. DANIEL: Well, I guess my question – to simplify my question is by delaying this into Addendum IV, do we lose any protection of the silver eels that are so important to bluegills.

EXECUTIVE DIRECTOR BEAL: I guess that depends on whether the states could have implemented a closure this fall or not. That is a question for the board. Other comments on that? Mitch.

MR. FEIGENBAUM: Yes, I'll let Jim correct me if I'm wrong, but I suspect that the silver eel fishermen on the Delaware are putting their weirs in at this time. It is basically a late summer construction project to set up the fishery for the fall. I was going to say why don't we table this until after lunch, because I think we could resolve it? But in fairness to the fact that

the fishermen are already in the water and it is probably impractical to implement anything until 2014, I would therefore support the motion, because we can get Addendum IV done in time for 2014 either way.

EXECUTIVE DIRECTOR BEAL: I don't think though that we have the luxury of doing this after lunch. I think we need to wrap this up and then get on to the other board meetings we have this afternoon.

MR. FEIGENBAUM: I support the motion.

MR. O'REILLY: I agree with what Louis indicated about making more progress, and the only thing that was a hang-up for me on the New York situation was that in the working group it talked about effort reduction. Given that there are so few permits, I don't really know what that would entail.

But I think if there had been language in that substitute motion that had said provisions will be described by the technical committee for some type of compensation, then that would have been enough for me, but that wasn't there. New York has had a couple of good years the last two years; but even with a couple of good years of all the eel landings, it is about 3 percent of the total.

I know how much of that is silver eel, but I think the big problem is – and Paul talked about it – we really don't know how large this is, so some things to find out, but I would like to see us do something on silver eels today if possible. Some states might be able to implement it fairly quickly; others won't, but it certainly would be better than delaying.

MR. RUSS ALLEN: Just to follow up on that, if we delay silver eel regulations today and we push that all the way back into Addendum IV, which probably gets through in February, we'll never have that in place by September 1st. We do have a couple fishermen who do catch silver eels in fyke nets. We won't have that in place for next year at all. I see that as a 2015 thing. I would rather see that get done right now if possible, also.

EXECUTIVE DIRECTOR BEAL: All right, other comments; folks that haven't commented on where to go with silver eels. We've got a substitute motion to defer this issue to Addendum IV. Is there any other comment on that? Are folks ready to vote on that substitute motion? Seeing none; I'll read it into the record while the states caucus.

Move to substitute for further consideration of silver eel fisheries into Addendum IV. Motion by Mr. Stockwell; second by Mr. Gilmore. Those in favor of this motion, please raise your right hand; those in opposition like sign; abstentions; any null votes? **The motion fails; 8 votes in favor, 10 votes in opposition.** We're back to the main motion, which is Option 2, seasonal closure as presented in Addendum III. Leroy.

MR. YOUNG: What will this mean to the silver eel fishery? Is there going to be reduction in harvest or is this just status quo?

MS. TAYLOR: This would prohibit these fisheries from occurring.

MR. FEIGENBAUM: **I would like to make a motion to amend the primary motion to include an exemption for spearing** and to include a one-year exemption for the state of New York, which would then give us an opportunity to address Jim's concerns, which I do think is fair, as opposed to going to the silver eel fishermen in Delaware who may have been spending the last two weeks building a weir and telling them you're not allowed to fish this year, take it out, no warning, no notice.

EXECUTIVE DIRECTOR BEAL: The motion by Mitch is to exempt spearfishing gear and to exempt New York for the 2014 fishery. Paul Diodati is seconding that. Mitch, is that specific to the New York Delaware River Weir fishermen?

MR. FEIGENBAUM: Yes. I don't know of any others.

EXECUTIVE DIRECTOR BEAL: Okay, Paul, you're okay with that? Okay, Paul indicates yes.

Any discussion on this motion to amend the main motion? Adam.

MR. NOWALSKY: Just to be clear, Mr. Chairman, I heard you say exempt it for the 2014 fishery. The motion was for a one-year exemption, which I would assume would be from the implementation date that we still have to determine. In all likelihood, they're going to be the same, but just for clarity sake I heard you say something different than what is up there right now.

EXECUTIVE DIRECTOR BEAL: That's a fair comment, Adam. I think, Mitch, the intention was the first year that the closure would be required of all states; New York would be exempted from that closure.

MR. FEIGENBAUM: No, actually the intention was that New York would be exempted from the closure if it were to apply to 2013, this year.

MR. NOWALSKY: Well, if that is the case, I would suggest that we won't know that until we vote on a n implementation date; and in all likelihood, I am going out on a limb here that the implementation date is probably not going to be this fall for this.

MR. FEIGENBAUM: Fair point; you have a lot more experience than I do in how these things go. I just want to get a result. How we get to the result I will leave it to the smarter guys than me.

EXECUTIVE DIRECTOR BEAL: Are folks comfortable with taking up a New York exemption until we talk about the implementation date of Addendum III, should we ever get to that point?

MR. FEIGENBAUM: Yes, if everyone would agree, I would just change the amendment to only include the spearing, and then we can talk about New York when we talk about implementation dates.

EXECUTIVE DIRECTOR BEAL: Paul, are you comfortable with that change, just doing the

spearfishing? All right, it just deals with spearfishing. Leroy.

MR. YOUNG: Just a quick question for clarification; what is this spear fishery all about? How many fish do they take; what is that about?

EXECUTIVE DIRECTOR BEAL: Paul, can you give some insight on this fishery?

MR. DIODATI: I think I am going to ask Dan to help with that.

EXECUTIVE DIRECTOR BEAL: Dan, the local spearfishing expert.

MR. DAN McKIERNAN: No, we actually don't have any estimates except that was the most substantive comment we got at the public hearing from the local native tribe that they just wanted that gear to be exempted. If they are taking eels during the fall, that is a technique that they use, so this proposal was designed to prevent the harvest of exiting eels in the water column. Obviously, we thought it's the weir fishery that should be targeted, and this is simply another technique come in the fall that they will take eels one at a time. We just didn't want to make it a blanket prohibition.

MR. FEIGENBAUM: Yes, and in fact most of those speared eels would not be silver eels, because you spear dormant eels that are lying down for the winter. Of course, we know that a mature silver eel is migrated at that point.

EXECUTIVE DIRECTOR BEAL: Do we need to caucus on the motion to amend for the spear fishing exemption? Seeing none; all those in favor of the spearfishing exemption, please raise your right hand; those in opposition; abstentions, one abstention, Rhode Island; any null votes? Seeing none; **the motion carries 15 votes in favor, none in opposition, and one abstention from Rhode Island.** That language will be included in the main motion.

Is there anymore discussion on the main motion, Option 2, with the spearfishing exemption? Seeing none; I'll read that into the records while the states caucus: move for Section 4.1.3 for

silver eel fisheries, adopt Option 2, seasonal closure, with the exemption of spearfishing. All those in favor of this motion, please raise your right hand, **18 votes in favor, and that is all the votes we have, so the motion carries unanimously.**

Is there anything else on Addendum III? Kate, was it the pigmented eels; was there a motion needed on that? That is the only other issue that someone contemplated including in this discussion. I don't know if anyone has a motion on that based on the recommendation of the working group or anything else. Mitch.

MR. FEIGENBAUM: I would like to move that the harvest of any American eel under the auspices of a glass eel fishery – let me rephrase that. I move that the harvesting of fingerlings or pigmented eels beyond year one be banned. I think the better way of making this motion is to say I would like to incorporate the working group language. Sorry about that; I am getting tongue-tied. **I move that we adopt the working group recommendations on the prohibition of the take of fingerlings; otherwise known as a pigmented eel tolerance.**

EXECUTIVE DIRECTOR BEAL: Kate, could you provide that language from the working group?

MS. TAYLOR: The recommendations of the working group are the pigmented eel tolerance and any restrictions prohibition on the harvest of this life stage. This could be accomplished with the use of an eighth inch non-stretchable mesh and potentially with a 1 percent tolerance by count.

EXECUTIVE DIRECTOR BEAL: We'll get that wording in there, but is there a second to this provision? Terry Stockwell, thank you. Is there any need to discuss this issue on the harvest of pigmented eels and the one-eighth inch stretch mesh to determine what is a pigmented eel?

MR. GROUT: I just need to have a clarification of whether this working group recommendation

is significantly different from Option 5. Do we need to go out to public hearing on this?

MS. TAYLOR: Under the pigmented tolerance language that was included in the document that went out for public comment, it just says that there would be a small tolerance, a maximum of 24 pigmented eels per pound of glass eel catch of pigmented eels would be allowed, and that states would have the option to propose other restrictions such as the mesh size to meet the goal of minimizing the development of this pigmented eel fishery. The working group recommendation, instead of saying this 25 glass eel tolerance, is just saying that they are applying this restriction and potentially through the use of this eighth inch non-stretchable mesh.

MR. GROUT: You feel that this isn't sufficiently outside of the draft public hearing document that would warrant needing to go back out to public hearing?

EXECUTIVE DIRECTOR BEAL: I think it was more of a clarification on what would be determined to be a pigmented eel. I think the notion of the tolerance obviously went out for public comment. It doesn't seem too far afield from what was included. Other comments on this motion.

Seeing none; I'll read it into the record while the states caucus: move to adopt the working group recommendation on Option 5, pigmented eel tolerance. All those in favor of the motion, please raise your right hand; all votes in opposition; abstentions; null votes. **The motion carries unanimously.** I think that brings us through all the issues that were contemplated in Addendum III that the board wanted to tackle today. Bill.

MR. ARCHAMBAULT: Just a quick clarification Mr. Chairman; will the habitat recommendations be adopted; are they already part of Addendum III when we vote to move this?

EXECUTIVE DIRECTOR BEAL: I think that was the intent. Is there any objection to approving the habitat recommendations as part

of Addendum III once this moves forward; and the monitoring requirements? Seeing none; then it will be part of the package. Is there a motion to approve the addendum and include an implementation date with consideration of what we discussed earlier for New York's Weir Fishery? Yes, Doug.

MR. GROUT: **Yes, I would like to move approval of Addendum III as modified today with an implementation date of January 1, 2014.**

EXECUTIVE DIRECTOR BEAL: Is there a second to that? Bill McElroy, thank you. A need to talk about this? Jim.

MR. GILMORE: Just so I understand this now; I need the one-year exemption, whatever, to get through this; but then now that we've taken the silver eel fishery out of Addendum IV, I don't know how to get it back in here. Just as a question; if I add it on and essentially amend this to consider the New York Weir Fishery in Addendum IV as a stand-alone item under the silver fishery; is that the way to handle this? I'll make that amendment if that is the way to do this. I can't come up with a better way of how we're going to address this, because a one-year extension or whatever, even getting through this year, doesn't fix the longer-term problem.

EXECUTIVE DIRECTOR BEAL: You have that option of making that motion to amend if you would like unless anyone else has a suggestion.

MR. GROUT: Well, we can go back and look at the substitute motion that was defeated, but I would say if we adopted this motion and you could make another motion to include just your fishery – consideration of your fishery in Addendum IV. Because, the other motion I think had your fishery and the spear fishery.

We were trying to put everything considering silver eels into Addendum IV; not just a specific part. That is the way I would look at it is to do it. After we approve the Addendum here, then make a motion to include consideration of your fishery in Addendum IV.

EXECUTIVE DIRECTOR BEAL: All right, Jim, are you comfortable with that approach of making a subsequent motion after this, because that is the next step in this process, as painful as it may be, is going back to the list of issues that are going to be included in Addendum IV.

MR. GILMORE: M r. Chairman, could we bring, if Mari-Beth is still around; I just want to make sure that works. She understands the fishery a lot better than I do. C ould we just bring her up for a comment on that? I think I'm okay with it, but I would like to hear from her.

EXECUTIVE DIRECTOR BEAL: M ari-Beth can we put you on the spot one more time?

MS. DELUCIA: If I got you right, this year we would be exempt. Mitch is right, the fishermen are actually building their weirs right now. We would discuss other options in Addendum IV. I think that would work. The fishery is from August to November 1st; that's it. It is a very short fishery. Does that work?

EXECUTIVE DIRECTOR BEAL: J im, it sounds like inclusion in Addendum IV might work for New York.

MR. GILMORE: I'm sorry, Mr. Chairman, say that again.

EXECUTIVE DIRECTOR BEAL: B a sed on Mari-Beth's comments, it sounds like inclusion of this issue in Addendum IV might work for New York since the implementation date is not until 2014.

MR. GILMORE: Yes. The question to you; do you think we would be able to – in terms of Addendum IV, we would be able to have this in place by the 2014 season, because that would be the only limitation we would be facing. If we can, then essentially we would want to try to have an exemption for a full year from January 1st.

EXECUTIVE DIRECTOR BEAL: Yes, Jim, I think the intention is to bring Draft Addendum IV back to this board either in October or in February and final approval in May at the latest.

MR. O'REILLY: I was just wondering; Option 2 under silver eels passed, and the language that exempted New York was withdrawn from that substitute motion; but Option 2 is there; correct?

EXECUTIVE DIRECTOR BEAL: Yes, Option 2 is in place right now, which is the fall closure.

MR. O'REILLY: Jan uary 1 is the implementation of that. Is that, Jim, what you're looking towards, that there would be the ability before that next season starts in 2014 that Addendum IV is in place?

MR. GILMORE: Correct; we essentially want to maintain the 2013 and the 2014 harvest in the weir fishery, and by then for the following years we'll have a permanent solution to what we're going to do with that fishery.

MR. NOWALSKY: M r. Chairman, I would hate to see us feel the need to – clearly, we all want to do something with glass eels, so Addendum IV is clearly going to be a priority. I would hate to see it not get done correctly because of the rush to do something for New York for 2014 for their weir fishery. **I think we would be better served today, and I'll make a motion to amend to include an exemption to the implementation date for the 2014 New York Weir Fishery.**

EXECUTIVE DIRECTOR BEAL: Is there a second to that motion? Dr. Rhodes, thank you. Okay, let's focus on the motion to amend, which would give the New York, Delaware River weir fishermen a pass for 2014 fishery for that one year. Any other comments? .

DR. DANIEL: I'm trying to find Option 2 in here to see exactly what it says. I thought it was a seasonal, like a two-week closure; right?

DR. MALCOLM RHODES: No, it is a four-month closure.

EXECUTIVE DIRECTOR BEAL: Are you all set, Louis?

MR. NOWALSKY: The motion on the board doesn't reflect one year, I don't believe, and it should reflect that. As it states right now, it just states it is a general exemption, but that exemption would only be for one year. Again, I believe the intention of New York is to make a motion to include more discussion about this in Addendum IV.

EXECUTIVE DIRECTOR BEAL: Any other need to talk about the motion to amend? Seeing none; I'll read into the record while the states caucus: move to amend to include a one-year exemption for the implementation date of the New York Delaware River Silver Eel Weir Fishery.

All those in favor of this motion, please raise your right hand; those in opposition; abstentions, one abstention from New Hampshire; any null votes? **Seeing none; the motion carries 15 votes in favor, 2 in opposition and one abstention. That will be added to the main motion.** The main motion will now approve Addendum III as modified with the implementation date of January 1, and it will have a one-year exemption for the New York Delaware River fishery.

Is there any need to talk about that motion? Seeing none; all those in favor of the main motion please raise your right hand; those opposed to the main motion; abstentions, two abstentions, both federal services; any null votes? **Seeing none; the motion carries, 15 votes in favor, 1 in opposition with 2 abstentions.** That brings us to the portion of the meeting where we are going to talk, hopefully quickly, about the issues included in Addendum IV. Jim, do you have your hand up?

MR. GILMORE: I am going to make a motion, but I don't know if you want it now or do you want to have some discussion.

EXECUTIVE DIRECTOR BEAL: Motions are good; now is always good.

MR. GILMORE: **Okay, I would move to add to Addendum IV consideration for a limited**

weir fishery for the Delaware River in New York.

EXECUTIVE DIRECTOR BEAL: Before I ask for a second, I just wanted to make sure the record is clear that North Carolina was the one state in opposition to that, so we have a full record of how our folks voted on that. Is there a second to the motion that Jim Gilmore made? Adam Nowalsky, thank you.

We'll get that motion up on the board. Comments on including New York Weir Fishery in Addendum IV. Jim, the working group in the original addendum had a number of options in that. Are you looking for additional options to be included in Addendum IV? Is that something we should work with you on?

MR. GILMORE: Not that I am aware of at this time. Those options were fine; it just needed to be discussed a little bit more, because some of them were a little bit confusing, particularly the monitoring requirements. We can discuss that through the addendum.

EXECUTIVE DIRECTOR BEAL: Jim, essentially we'll just take the Addendum III wording and put that in IV and have some more discussion. You will have the opportunity to talk more at home on that.

MR. GILMORE: Yes, that sounds good.

EXECUTIVE DIRECTOR BEAL: All right, great. Any other comments on this motion? Any opposition to including this issue in Addendum IV? **Seeing no opposition; motion carries.** Any other issues? Mr. Stockwell.

MR. STOCKWELL: Mr. Chairman, given the grave importance of this elver fishery to the state of Maine and before we do it anymore injustice, could you lay out the process that you envision that we're going to move ahead with this addendum? We've been here for five hours and I hate to see people making motions on the fly that we might have to chase their tails on later.

EXECUTIVE DIRECTOR BEAL: Yes, I don't know if we have a course set. You folks did

pass the first motion of the morning that included some of the provisions that would be included, including transferability and quotas and monitoring and a number of other things. There are a couple of ways to tackle this, and I know folks are tired.

One is the board could give some guidance to the working group, and we can reconvene that group and have them come up with some of the suite of options. I think a lot of folks liked some of the ideas that the working group has already included, and we can start with that as the basis for that discussion if the board is comfortable with that. If there are other approaches, I think we should talk about it now. The working group had a pretty wide representation up and down the coast, and different interests. That may be a starting point but it is up to the group. Yes, Terry.

MR. STOCKWELL: Mr. Chairman, I think given the many comments we had around the table on the quality of the work that the working group did, I think it might be helpful for whether it is the technical committee or the PDT to review those recommendations and then to repopulate the working group with a little broader board representation. I would particularly like to have New Hampshire on the working group.

EXECUTIVE DIRECTOR BEAL: Doug, you had your hand up and you've been nominated.

MR. GROUT: Maybe I'll delegate it to Ritchie. He's not here, right? I guess my personal preference – and I guess this is going to mean we're going to have to go to the board – is that I think we should take working group recommendations along with the crux of that motion and give it to the PDT and technical committee and let them come up with something and then bring it back at the October meeting. I think we've had a working group; we have a motion from the board. That is the basis and let the PDT bring it together. That is their role.

EXECUTIVE DIRECTOR BEAL: Are folks comfortable with having the PDT charged with drafting Addendum IV; and the glass eel section,

the basis for that will be the recommendation from the working group that has already been received by the board. Does anyone have a problem with that; let me put it the other way.

PLAN DEVELOPMENT TEAM

All right seeing none; Kate tells me that the Plan Development Team will have to be repopulated to some degree. We don't have to do it now, but we're going to reach out to the states and ask for some additional horsepower to draft this document. The timeline will be bringing this back – yes, Doug.

MR. GROUT: I nominate Ritchie White for the PDT.

EXECUTIVE DIRECTOR BEAL: The last time he ever goes to lunch early, huh? We'll reach out to the states and get a few folks to help Kate out with drafting the document. The intention will be to bring that back at the annual meeting in October. Is everybody comfortable with that? Kate and I are chatting offline here.

The first motion that was passed by the board essentially captures the main themes of the working group recommendation. That again will serve as the basis for the PDT effort. Okay, beyond the glass eel fishery, two other issues came up. One is aquaculture that Louis and Paul mentioned earlier about the notion of potentially considering a domestic allocation for the glass eel fishery.

Are folks comfortable with the PDT exploring that and including some language, and you guys can take it or leave it at the annual meeting? No opposition there. Okay, we mentioned earlier to include the ESA listing or potential ESA listing as part of the background of the document, and we will include that. Yes, Dave.

MR. SIMPSON: Yes, the point about domestic fishery, I completely agree that was a great example of why we want to consider broader opportunity for a glass eel fishery and the idea of domestic aquaculture is a great idea, but some of that discussion made me very anxious about individual companies getting quota.

All of that stuff opens up a can of worms in my mind. These are all domestic fisheries. This isn't TALF or anything; these are all domestic fisheries, and it starts to get you in a discussion about what a fisherman may do with his product; may he sell them overseas, may he not sell them overseas? I think as a reason to move forward with this addendum it is great; but getting into specifics and set-asides and so forth, I think takes us down a path we don't want to go.

EXECUTIVE DIRECTOR BEAL: Thanks, David, and I guess international issues and trade issues and those sorts of things get the state department involved and a bunch of other things potentially. We can wrestle with that a little bit as part of the Plan Development Team.

DR. DANIEL: I think Dave makes a good point. I think though it could be allocated to a state and then allocate that; then states would be responsible for determining whether it is a legitimate brick-and-mortar aquaculture operation. I think there are ways that we can address those concerns and move forward with this.

EXECUTIVE DIRECTOR BEAL: The other notion that was out here is the transfer of yellow eel quota into glass eel fishery and that conversion factor. If the board wants to go down that road, the first step there is obviously setting up yellow eel quotas for the states, and the board chose not to do that today. Should those options be considered and that potential conversion factor explored by the Tech Committee and Stock Assessment Subcommittee as part of this document or not? Tom.

MR. FOTE: Bob, I feel uncomfortable with us sitting five and a half hours at a meeting to start doing things really fast. We're all tired and we've all been going through – some of us are supposed to eat every couple of hours and we've been sitting here for a long time. I am really thinking that we should basically wrap this up before we start going any further.

MR. STOCKWELL: To your point, Mr. Chairman, that was one of the working group

recommendations; and when the PDT and the technical committee reviews it, I think it will either rise or fall on its own merit.

EXECUTIVE DIRECTOR BEAL: Great, it is fair game for them to consider it, I guess is the best way to put it. That will be explore potential for yellow eel quotas. Is there anything else, anything at all? I think we're all set.

ADJOURNMENT

I don't see anything else coming before the Eel Board under other business. Kate, is there anything else we need to do? PDT has adequate direction. You'll hear from us asking for members. Let's break for lunch.

(Whereupon, the meeting was adjourned at 1:20 o'clock p.m., August 7, 2013.)

American Eel Compliance Reports

STATE OF MAINE



2013 AMERICAN EEL ANNUAL REPORT TO THE ATLANTIC STATES MARINE FISHERIES COMMISSION

Prepared by:

Gail S. Wippelhauser
October 9, 2013

This report describes Maine's eel fishery and management program for calendar year 2012, and changes which have occurred or will occur in the fishery and management plan during calendar year 2013.

1. Commercial Fishery

1a. Synopsis of changed regulations for glass eels:

In 2012, the following changes to elver laws were made:

The commissioner shall suspend or revoke the elver fishing license of any license holder 1) adjudicated in court of violating 12 §6575-D (molesting elver gear), 2) adjudicated in court or convicted of violating 12 §6505-A (elver fishing license violation), 3) adjudicated in court of violating 12 §6505-B (untagged elver gear), 4) adjudicated in court of violating 12 §6575 or 6575-A (fishing during a closed season or a closed period), or 5) adjudicated in court of violating 12 §6864 (elver dealer's license). For a first offense the commissioner shall suspend the license holder's license for 3 years (item 1) or one year (items 2-5). For a second offense the commissioner shall permanently revoke the license holder's license (items 1 and 3-5) or permanently revoke the person's eligibility for the elver lotteries (item 2).

An elver lottery was established under which the number of pieces of gear authorized does not exceed the number of pieces of gear authorized as of December 31, 2011.

Fines for civil violations of some elver and eel laws were intended to be increased, but language was incorrect (e.g. "a fine of \$2,000 **may** be adjusted" should have been "a fine of \$2,000 **shall** be adjusted.")

The closed period for elver harvesting was changed from two consecutive days to noon Tuesday to noon Wednesday and noon Saturday to noon Sunday.

In 2013, the following changes were made for violations of elver laws.

6505-A Elver Fishing license

Class D crime, mandatory fine of \$2000.

6505-B Elver gear

Class D crime, mandatory fine of \$2000.

6575 Open season, elver harvesting

Class D crime, mandatory fine of \$2000.

6575-A Closed period, elver harvesting

Class D crime, mandatory fine of \$2000.

6575-B Method of elver fishing; limits on gear

Class D crime, no minimum fine

6575-C Closed areas, elver fishing

Class D crime, no minimum fine

6575-D Molesting elver gear

Class D crime, mandatory fine of \$2000.

6575-G Dams with fishways

Class D crime, mandatory fine of \$2000.

6575-H Sale of elvers

Class D crime, mandatory fine of \$2000.

6864 Elver dealer's license

Class D crime, mandatory fine of \$2000.

Legislation was passed that exempts members of the Passamaquoddy Tribe, Penobscot Nation, Aroostook Band of Micmacs, and Houlton Band of Maliseet Indians, who are residents of the State, from being required to hold State licenses to fish for elvers. Each group was allowed to issue a specific number of tribal permits for the fishery.

1a. Synopsis of regulations for coastal pot fishery for yellow eels: unchanged.

1a. Synopsis of regulations for inland pot fishery for yellow eels: unchanged.

1a. Synopsis of regulations for inland weir fishery for silver eels: unchanged.

1b Directed harvest for glass eels

1b1

Dealers reported landings of 20,764.37 pounds of glass eels, valued at \$38,760,490.51. Of the total, 5,753.21 pounds were taken with dipnets; 13,461.76 pounds were taken with fyke nets; and 1,549.4 pounds did not have an associated gear type (Table 1). All glass eels were harvested for food. Catch was greatest in April. Dealer data are provided in the attached excel file (dealer tab).

Harvesters make daily estimates of their catch. They reported landing 19,141.18 pounds of glass eels of which 6,568.45 pounds were taken with dip nets; 12,559.38 pounds were taken with fyke nets; and 13.35 pounds did not have an associated gear type. Harvester data are provided in the attached excel file (harvester tab).

1b2 No biological data were collected.

1b3 Glass eels are aquacultured for food.

1c Elvers (YOY or glass eels) are exported very soon after purchase.

1d From the harvester reports, excluding records where effort or gear were 0, average dip-net CPUE (pounds per hour per net) for all trips was 0.21 (range = 0.000 to 20.67), and average fyke-net CPUE (pounds per hour per net) for all trips was 0.23 (range = 0.000 to 22.5).

1e Personal catch is not permitted.

Table 1. Summary of catch, number of license, and pieces of gear. Catch for 2013 is preliminary and subject to change. License and gear for data 2013 includes Maine licenses, Maine licensed gear, tribal permits, and tribal permitted gear.

Year	Harvest (pounds)	Number of licenses	Number of fyke nets	Number of dip nets	Total number of nets
2013	18,076	658	474	336	810
2012	20,764	557	340	172	512
2011	8,585	407	350	175	525
2010	3,158	429	366	185	551
2009	5,199	451	382	195	577
2008	6,952	468	393	199	592
2007	3,714	510	428	211	639
2006	6,967	653	510	279	789
2005	5,476	284	320	103	423
2004	1,284	267	228	93	321
2003	3,325	462	506	190	696
2002	9,654	443	496	231	727
2001	1,687	459	521	251	772
2000	2,625	665	754	378	1,132
1999	3,587	744	804	438	1,242
1998	14,360	2,314	3,806	2,111	5,917
1997	7,360	1,399	1,844	1,283	3,127
1996	10,193	2,207	2,632	2,075	4,707
1995	16,599	< 1,868			
1994	7,374				
1978	16,645				
1977	22,000				

1b Directed harvest by month for yellow eels (coastal pot fishery and inland pot fishery) and silver eels (inland weir fishery)

1b1 A total of 10,425 pounds of eels were taken by the coastal pot fishery, 360 pounds by the inland pot fishery, and 485 pounds by the inland weir fishery. Dealer (dealer tab) and harvester (harvester tab) data are provided in the attached excel file.

1b2 No biological data were collected.

1b3 Use of harvest (Table 2).

1c Estimates of export by season: not provided by dealers.

1d Mean CPUE (pounds per hour per gear) for the coastal pot fishery was 1.27 (range = 0.008-38.5).

No effort data was reported for the inland pot fishery and the weir fishery.

Table 2.

MARKET	GEAR_NAME	Bait	Discard	Food	Other	Personal Use	Sold to Dealer
EV	DIP NET COMMON			0.25	2.18		4671.18
EV	FYKE NET OTHER / NK SPECIES				116.68		10388.91
EV	UNKNOWN				5.33		5.10
unsized	POT & TRAP EEL COASTAL	1170.25	439.00			10.00	8805.40
unsized	POT & TRAP EEL INLAND	80.00				200.00	80.00
unsized	WEIR EEL				489.85		

2. Recreation Fishery

2a Synopsis of regulations – coastal waters eels: unchanged.

2a Synopsis of regulations – inland waters: unchanged.

2b Harvest

There is no estimate of recreational harvest for coastal or inland waters for 2012, and biological data were not taken.

3. Fishery-independent monitoring

3a. YOY Survey

All YOY data have been provided to the ASMFC American Eel Stock Assessment Subcommittee.

Methods

Methods were unchanged from 2003 through 2011, but some changes occurred in 2012. In the summer of 2011, MDOT installed a new gate in the dam at the outlet of West Harbor Pond that prevents the installation of the middle elver passage. This passage had a substrate of Akwadrain, and primarily was used by small yellow eels. The Specialist who had done the sampling prior to 2012 retired, and staff at the DMR Boothbay Harbor Laboratory are now collecting data. Height of water over or below the dam was not recorded in 2012. Finally, some environmental data is no longer collected by the Boothbay Harbor Laboratory.

Results and Discussion

Two passages at West Harbor Pond became operational on March 26. Young-of-year (YOY) immediately began migrating into the pond, and approximately 97% of the catch moved upstream in the first ten nights. A total of 156,472 YOY, which represents the highest catch on record, and 45 yellow eels entered West Harbor Pond in 2012 (Table 3). However, the catch may have been poached on two nights, the attraction water tubing froze on the first three nights, the attraction water was off one night, and water level were high from 4/24 – 5/2 (see attached excel file; YOY tab). Recruitment began when sea surface temperature was 9.2°C, and sea bottom temperature was 8.2°C. Pond temperatures are not available at this time (new software needs to be purchased). Juvenile yellow eels recruited into the pond between March 27 and May 3.

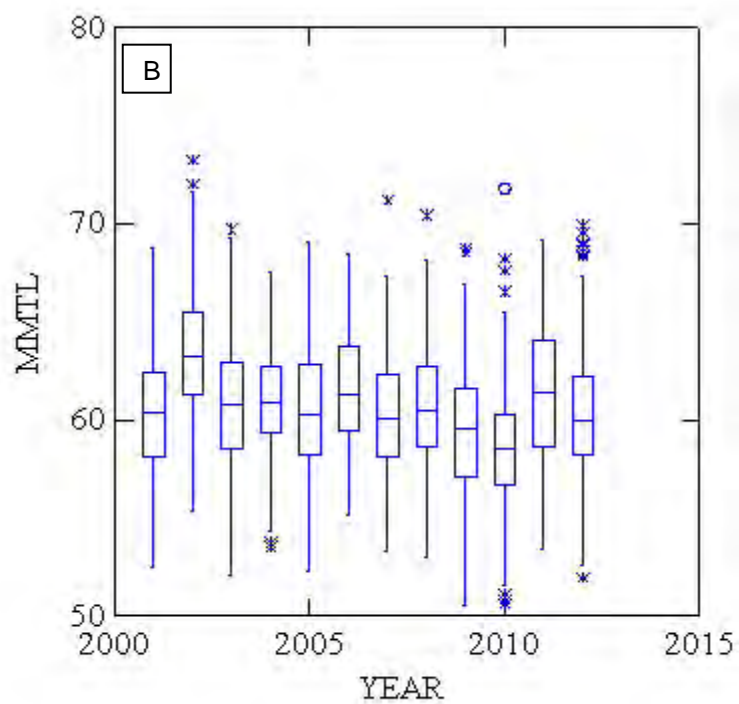
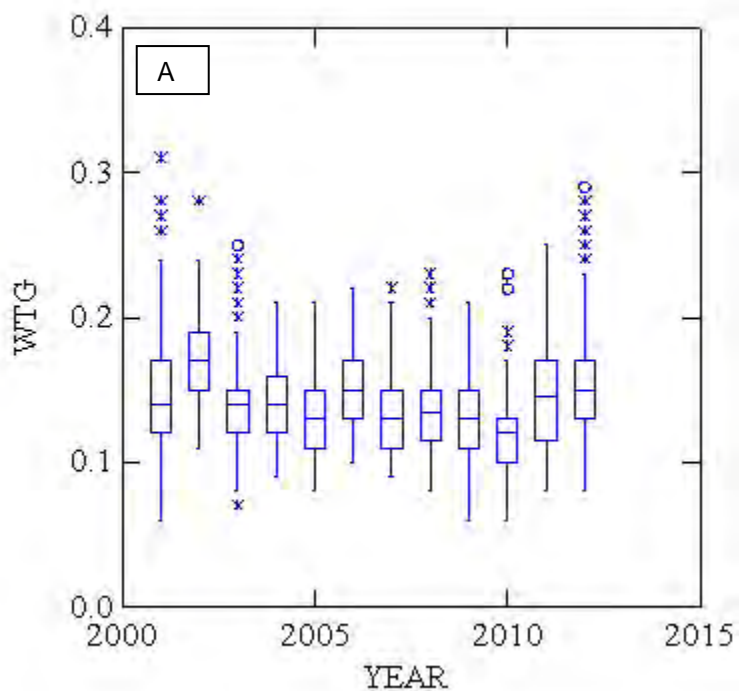
Initiation of the migration at West Harbor Pond does not appear to be related to day length, sea surface temperature, pond temperature, or freshwater discharge. Daylight has ranged from 12.5 to 14.2 h (March 28 and May 10, respectively), sea surface temperatures from 4.4-11.4°C, pond temperatures from 4.6-14.2°C, and freshwater discharge from below to well above the median.

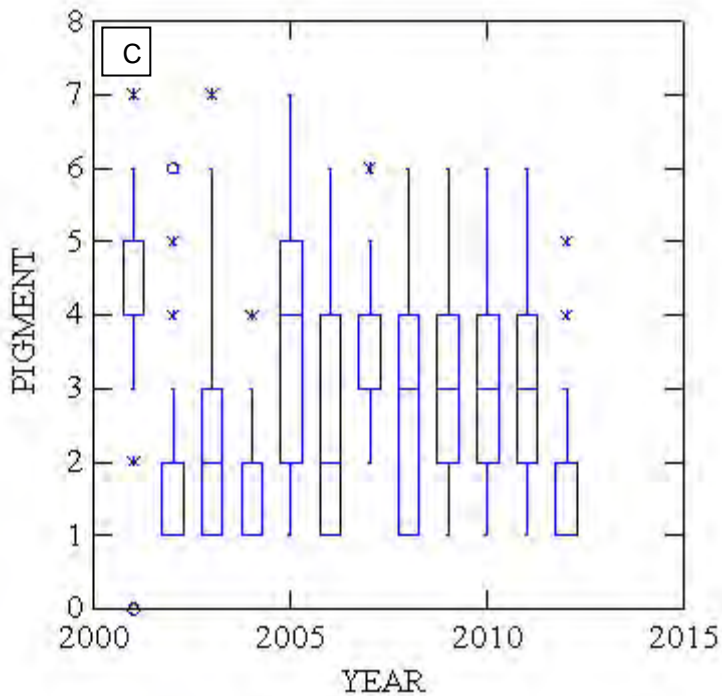
Measurements of total length, weight, and pigmentation stage were made on 164 individual YOY. Total length ranged from 51.91 to 69.91mm, weight from 0.08 to 0.29 g, and pigmentation from stage 1 to stage 5. Biological characteristics of YOY at West Harbor Pond vary annually (Figure 1).

Table 3. Summary of young-of-year and juveniles recruiting to West Harbor Pond, 2001-2012.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Start date of run	5/2	3/29	4/17	4/23	4/21	3/28	5/10	4/23	5/6	4/26	5/2	3/27
Start sea surface temperature (C)	9.4	4.8	4.4	7.3	7.8	6.1	11.4	9.6	9.9	9.8	9.2	5.7
Start sea bottom temperature (C)	8.2	4.8	3.4	6.0		5.4	9.2	9.6	9.3	9.8	8.0	ND
Start pond temperature (C)	12.3	4.6	5.8	9.5	11.2	5.0	13.7	14.2	13.7	13.3		ND
End date of study	6/14	5/30	6/26	5/24	6/23	5/30	6/15	6/12	6/11	5/31	6/7	5/3
End sea surface temperature (C)	15.2	13.4	17.7	11.6	15.8	15.7	13.6	14.0	13.0	12.2	14.1	7.5
End sea bottom temperature (C)	13.2	10.9	13.7	10.9	13.5		13.9	14.0	12.8	12.2	11.2	ND
End pond temperature (C)	22.6	22.2	22.6	15.9	16.7	17.8	18.6	19.3	18.1	20.8	18.7	ND
Number fishing days	44	60	49	45	40	52	36	36	38	41	36	28
Total number of YOY	52,638	82,359	15,905	2,401	73,178	4,812	988	46,167	12,811	10,314	9,658	156,472
Total number of juveniles (yellow)	1,419	1,707	1,110	416	150	66	23	67	25	13	28	45

Figure 1. Box plots of (A) total length, (B) individual weight, and (C) pigmentation stage of West Harbor Pond YOY, 2001-2012.





4. Characterization of other losses

No information on the characterization of other losses was collected.

5. Management program for 2013

Commercial elver fishery, yellow eel fishery, and silver eel fishery

Changes to the commercial elver fishery were made by the Legislature in 2013.

Recreational eel fishery

No changes are anticipated in 2013.

Fishery independent monitoring

Additional fisheries independent monitoring has been moved to the first dam on the Sebasticook River (Benton Falls). Data were provided to the Stock Assessment Subcommittee.

Characterization of other losses

Studies to characterize other losses are not planned.

**State of New Hampshire
Compliance Report for American Eel
September 1, 2013**

Request for *de minimis*

The State of New Hampshire requests *de minimis* status for the American eel (*Anguilla rostrata*) in 2013. No American eels were harvested for commercial purposes in 2011 or 2012, which constitutes less than one percent of the coast wide commercial landings for the same two year period.

1. Commercial Fishery

a. Synopsis of regulations in place (see laws and rules following)

Fis 603.11 American Eels

- (a) No person shall take or possess American eels (*Anguilla rostrata*) less than 6 inches.
- (b) No person shall take American eels, other than by angling, without obtaining the permit specified in Fis 609.01.
- (c) No recreational anglers shall possess more than 50 American eels for bait purposes. For purposes of this paragraph, recreational angler shall include other persons such as crew members involved in charter employment or in a fishing party.

b. Estimates of directed harvest

No individual sold commercially in 2012.

2. Recreational Fishery

a. Synopsis of regulations in place

See synopsis of regulations in above Commercial Fishery section.

b. Estimates of recreational harvest

There were 34 individuals permitted to harvest American eels in state waters. Out of these 34 individuals, 7 harvested eels. These 7 people harvested a total of 166.75 pounds, of which, 166.25 pounds were used for bait and 0.5 pounds were used for food.

The Marine Recreational Information Program (MRIP) estimated 15,644 eels were caught and 15,095 were harvested in 2012.

3. Fishery - Independent Monitoring

a. Results of the annual young-of-year abundance survey in 2012

An Irish elver trap was installed in April at the Lamprey River. It was planned that monitoring of the Irish Elver Ramp would continue until the fish ladder was closed. When the fish ladder is closed it competes with the Irish Elver Ramp. A small amount of water flows down the ladder and glass eels can ascend it into freshwater.

The Lamprey River site is located near the MacAllen Dam in Newmarket, New Hampshire where the New Hampshire Fish & Game Department monitors a fish ladder situated at this location. River discharge values (cubic feet per second) were taken from the USGS gauging site located approximately 3.3 miles upstream from the young-of-year survey site.

The annual summary of the young-of-year survey is in Table 1.

b. Description of other fishery - independent surveys performed and results

No other fishery-independent surveys were performed.

c. Projects planned for next five years

Projects planned for the next five years will be similar to the 2012 survey. The Lamprey River will be the chosen location for the young of the year study with an additional “pilot” location added at the Oyster River through the help of a volunteer group.

Sample Site Location

Lamprey River near the MacAllen Dam in Newmarket, New Hampshire

Sampling Gear

An Irish elver trap will be situated near an existing fish ladder.

Sampling Frequency

Sampling will occur four days per week during a minimum of a six week survey period.

Timing

The timing of the survey will coincide with the peak onshore migration of the young of the year.

Data Collection

The catch of eel will be enumerated and catch per unit effort for each day of sampling will be calculated. Ancillary data (date, weight, water temperature, moon phase, qualitative judgment of gear performance, etc.)

will be recorded according to the required fields established by the ASMFC Technical Committee.

4. Characterization of Other Losses

There are no ongoing monitoring programs required for American eel at New Hampshire power plants, except for the Seabrook Nuclear Power Station. No American eels were impinged at the Seabrook Nuclear Power Station in 2012.

There were no NH-issued scientific permits for American eel in 2012. There were no American eel mortalities recorded from the five New Hampshire coastal fishways in 2012.

Table 1. Annual summary of American eel young-of-the-year survey in New Hampshire, 2001- 2012.

Year	Monitoring Period	Date and Count First Observed in Trap	Peak CPUE (# Eels/Hr. Soak Time)	Date of Peak CPUE	Total Number Observed During Peak	Mean Annual CPUE	Total Number of Eels Observed During Year
2001	May 1-June 7	May 1 (4)	111.8	May 7	2,655*	10.9	6,356*
2002	April 19-May 23	April 19 (15)	391.8	April 20	9,600*	30.0	17,799*
2003	April 22-July 31 ⁺	April 30 (5)	65.6	July 7	1,559*	4.7	6,165*
2004	April 13-July 30	April 20 (1)	20.0	July 8+9	490/525	3.5	5,252
2005	April 18-July 28 ⁺⁺	April 21 (1)	12.7	July 14	314	1.5	2,095
2006	April 11-May 11 ⁺⁺⁺	April 14 (50)	26.3	April 25	571	5.5	2,637
2007	April 26-July 26	May 8 (6)	18.9	July 26	515*	0.9	1,240*
2008	April 22-August 1	May 22 (2)	14.4	July 10	231	1.1	1,361
2009	April 21-June 18	April 27 (1)	100.4	June 9	2,559	8.3	6,385
2010	April 26-July 8	April 26 (12)	1.3	May 26	25	0.2	208
2011	May 3-July 29	May 3 (3)	14.4	July 13	285	1.4	1,491
2012	April 3-July 26	April 23 (998)	50.5	April 23	998	2.8	4,213

* Values estimated

+ Two of the weeks were checked only once per week

++ Irish elver ramp was removed on May 25 and 26 due to high tides and high precipitation.

+++ Irish elver ramp was destroyed due to floods.

New Hampshire 2012 Regulations (Laws and Rules)

Laws

207:10 Prohibited Devices. – A trotline, tips-ups, set and traps lines, crossbows, spears, grappling hooks, naked hooks, snatch hooks, eel wires, eel pots, and nets, shall not be used in any fresh waters of the state to take fish, unless otherwise specifically permitted. No person shall possess, while hunting or trapping any wild bird, or wild animal, including bear, any snare, jack or artificial light, swivel, pivot or set gun, except as otherwise permitted. Any person convicted of illegal night hunting shall forfeit such firearms, jacks or other equipment used or usable in the illegal night hunting at the time of the violation. Prohibited articles, upon conviction of a violation of illegal night hunting, shall become the property of the fish and game department, and shall be sold at auction by the executive director within one year of the forfeiture. Nothing in this section shall be construed to prohibit the use of lights for checking traps as permitted in RSA 210:13.

Source. 1935, 124:1. 1937, 188:5. RL 241:9. 1945, 74:1. RSA 207:10. 1955, 48:1. 1971, 23:1. 1994, 51:2, eff. July 1, 1994. 1997, 8:1, eff. Jan. 1, 1998. 2001, 161:1, eff. Jan. 1, 2003.

211:49-a Nonresident Commercial Salt Water License.

I. Any person who does not qualify as a resident under RSA 207:1, who takes, possesses, lands, or transports by any method, from or on the waters of this state, regardless of where the catch was taken, any marine species by any method for the purpose of selling the same, shall first procure a valid license from the executive director to do so. This license shall not include the taking of lobsters and crabs, which requires a license under RSA 211:18. A nonresident shall not take sea urchins, clam worms, alewives, or scallops unless the state in which such person is a resident provides a reciprocal licensing privilege for residents of this state.

II. The fee for an annual license shall be \$300. The license shall be for the operator of the boat, vessel, flotation device, or gear, and helpers; provided, however, that helpers shall not be allowed for the taking of sea urchins or scallops by diving.

III. Licensees shall be responsible for conducting their fishing activities in compliance with rules adopted by the executive director under RSA 541-A.

IV. Any person so licensed shall furnish to the executive director such information concerning marine species and fishing activities as the executive director may require by rules adopted under RSA 541-A.

V. Any person convicted of violating any provision of this section shall be guilty of a violation if a natural person or guilty of a misdemeanor if any other person. In addition, the defendant's catch shall be confiscated and sold according to rules adopted by the executive director pursuant to RSA 541-A, the proceeds of such sale to become the property of the New Hampshire fish and game department.

Source. 1973, 348:2. 1983, 81:1. 1994, 150:1, 2, eff. May 23, 1994. 1997, 10:6, eff. Jan. 1, 1998. 2004, 166:4, eff. May 24, 2004.

211:49-b Resident Commercial Salt Water License.

I. Any resident of this state who takes, possesses, lands, or transports on the waters of this state any marine species by any method for the purpose of sale, regardless of where the catch was taken, shall first procure a valid license from the executive director to do so. This license shall not include the taking of lobsters and crabs, which requires a license under RSA 211:18.

II. The fee for such annual license shall be \$50. The license shall be for the operator of the boat, vessel, flotation device, or gear, and helpers; provided, however, that helpers shall not be allowed for the taking of sea urchins or scallops by diving.

III. Any person so licensed shall furnish to the executive director such information concerning the marine species or fishing activities as the executive director may require by rule.

IV. Licensees shall be responsible for conducting their fishing activities in compliance with the rules adopted by the executive director under RSA 541-A.

V. Any person convicted of violating any provision of this section shall be guilty of a violation if a natural person and a misdemeanor if any other person. In addition, the defendant's catch shall be confiscated and sold according to rules adopted by the executive director pursuant to RSA 541-A and the proceeds of such sale shall become the property of the New Hampshire fish and game department.

Source. 1983, 254:1. 1986, 9:2. 1991, 229:3. 1994, 150:3, eff. May 23, 1994. 1997, 10:8, eff. Jan. 1, 1998. 2004, 166:5, eff. May 24, 2004.

211:49-c Resident Wholesaler License.

I. Any person, firm or corporation engaged in a wholesale trade in any marine species shall first procure from the executive director a license to do so. Said license shall entitle the licensee to buy, sell, process, and transport any marine species in wholesale trade within the state and to ship any marine species within and outside the state. A separate extra facility license shall be required for each market, store, vehicle, or facility where such marine species are bought or sold at wholesale. A resident wholesaler license shall not be required by a person properly licensed pursuant to RSA 211:49-b. The fee for an annual license shall be \$100 and \$50 for each extra facility license. A copy of the license shall be carried in each vehicle and displayed at all facilities.

II. Any person, firm or corporation, whose ship, vessel, or similar craft is within the territorial waters of this state and engaged in the processing or wholesale trade of any marine species, excluding lobster and crabs, shall first procure a license as required under this section.

Source. 1988, 99:2. 1990, 32:2, eff. May 22, 1990. 1997, 10:9, eff. Jan. 1, 1998.

211:49-aa Nonresident Wholesaler License.

I. Any person, firm, or corporation who does not qualify as a resident under RSA 207:1 or RSA 211:43 and who is engaged in a wholesale trade in any marine species shall first procure a valid license from the executive director to do so in this state. The license shall entitle the licensee to buy, sell, process, and transport any marine species in wholesale trade within the state and to ship any marine species within and outside the state. A separate extra facility license shall be required for each market, store, vehicle or facility where such marine species are bought or sold at wholesale. A nonresident wholesale license shall not be required by a person properly licensed pursuant to RSA 211:49-a. The fee for an annual license shall be \$200 and \$75 for each extra facility license. A copy of the license shall be carried in each vehicle and displayed at all facilities.

II. No person, firm or corporation, whose ship, vessel or similar craft is within the territorial waters of this state shall engage in the processing or wholesale trade of any marine species, excluding lobster and crabs, without first procuring a license under this section.

Source. 1988, 99:1. 1990, 32:1, eff. May 22, 1990. 1997, 10:7, eff. Jan. 1, 1998.

214:9 Freshwater and Saltwater Recreational Licenses

The applicant shall fill out and subscribe to a blank to be furnished by the executive director and pay the agent the following fees, and the agent fee as provided in RSA 214-A:4:

II. If the applicant is a resident of this state and wishes to fish, \$33, and the agent shall thereupon issue a resident fishing license, which shall entitle the licensee to kill, take and transport all species of freshwater fish, under the restrictions of this title.

II-a. [Repealed.]

[Paragraph II-b effective until January 1, 2011; see also paragraph II-b set out below.]

XVI. (a) If the applicant is 16 years of age or older and wishes to take, possess, or transport finfish from coastal and estuarine waters under the restrictions of this title, the applicant shall pay the fee according to the schedule in subparagraph (e), and the agent shall thereupon issue a recreational saltwater license which shall entitle the licensee to take, possess, or transport finfish from coastal and estuarine waters, under the restrictions of this title, provided that any person participating in a recreational saltwater fishing opportunity on a for-hire vessel, which is licensed under subparagraph (b), shall be exempt from the license requirement of this subparagraph.

(b) A resident or nonresident owner or operator of a for-hire vessel who wishes to provide recreational saltwater fishing opportunities for persons taking finfish from coastal and estuarine waters, shall pay a fee for each charter boat and each party boat according to the schedule in subparagraph (e), which shall entitle the owner or operator of the licensed for-hire vessel to take, possess, or transport finfish from coastal and estuarine

waters, under the restrictions of this title.

(c) A nonresident holding a valid recreational saltwater license or a for-hire charter or party boat saltwater license from Maine or Massachusetts, shall be allowed to take, possess, or transport finfish from New Hampshire coastal and estuarine waters, provided that the state in which such person purchased a recreational saltwater license or in which the for-hire vessel is registered allows an angler with a New Hampshire recreational saltwater license or a saltwater for-hire vessel with a for-hire license from New Hampshire to recreationally take, possess, or transport finfish in that state's coastal and estuarine waters.

(d) In this paragraph:

(1) "Coastal and estuarine waters" means all waters within the rise and fall of the tide, and water below any fishway or dam which is normally the dividing line between tide water and fresh water, or below any tidal bound which has been legally established in streams flowing into the sea under the jurisdiction of the state.

(2) "For-hire vessel" means a party boat, charter boat, dive boat, head boat, or other boat hired by persons to engage in recreational saltwater fishing opportunities.

(3) "Recreational saltwater fishing" means taking of any marine finfish, by any means for personal use only and which are not sold.

(4) "Charter boat" means a vessel less than 100 gross tons (90.8 metric tons) that meets the requirements of the U.S. Coast Guard to carry 6 or fewer passengers for hire.

(5) "Party boat" or "head boat" means a vessel that holds a valid Certificate of Inspection issued by the U.S. Coast Guard to carry passengers for hire.

(e) The following fees shall apply:

(1) \$10 for resident and nonresident individuals.

(2) \$50 for charter boats and other for-hire vessels, except party boats.

(3) \$100 for party boats.

(f) The executive director shall adopt rules under RSA 541-A on the further definitions, criteria, and requirements for obtaining the licenses under this paragraph.

Source. 1935, 124:7. 1937, 156:1. 1941, 67:2, 3. RL 247:6. 1947, 163:2, 3; 217:1-3, 5. 1949, 245:1. 1951, 49:1; 181:1-5. RSA 214:9. 1955, 105:1; 324:1-3. 1961, 32:2. 1965, 49:1-4. 1969, 7:1; 63:2. 1971, 545:1. 1973, 72:22; 348:3-7. 1975, 66:1; 70:1; 337:1; 440:2. 1977, 15:1; 252:2; 459:6. 1981, 89:1, 2; 366:1; 498:1, 2. 1983, 40:2-4; 47:1; 87:1; 173:2. 1985, 291:18, 19, 23. 1986, 214:7-11. 1989, 159:1-3. 1990, 48:2. 1991, 125:1. 1994, 131:1, 1994; 151:3; 131:1; 372:3. 1995, 153:3, July 31, 1995. 1997, 10:15-18, 24, 25, III-VIII, eff. Jan. 1, 1998. 1998, 241:2, eff. Jan. 1, 1999. 2001, 180:6, eff. July 1, 2001; 252:11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 32, eff. Jan. 1, 2002; 252:12, 14, 16, 18, 20, 22, 24, 26, 28, 30, eff. Jan. 1, 2003. 2005, 143:4, eff. July 1, 2005; 153:1, eff. Jan. 1, 2006. 2007, 263:64, eff. July 1, 2007; 298:3, eff. Jan. 1, 2008. 2008, 151:2, 3, eff. June 6, 2008. 2009, 103:2, 5-9, eff. Jan. 1, 2011; 144:133, 136-140, eff. Jan. 1, 2011.

Rules

Fis 603.11 American Eels

(a) No person shall take or possess American eels (*Anquilla rostrata*) less than 6 inches.

(b) No person shall take American eels, other than by angling, without obtaining the permit specified in Fis 609.01.

(c) No recreational anglers shall possess more than 50 American eels for bait purposes. For purposes of this paragraph, recreational angler shall include other persons such as crew members involved in charter employment or in a fishing party.

Source. #2741, eff 6-13-84; ss by #4604, eff 4-26-89; amd #5412, eff 6-19-92; amd by #5521, eff 12-3-92; ss by #5789, eff 2-18-94; ss by #6176, eff 1-27-96; amd by #6916, eff 12-22-98; ss by #7215, eff 3-16-00; ss by #7371, eff 10-7-00

Fis 608.02 Harvest Reports

(a) Any person who possesses a permit in accordance with Fis 603.07, Fis 603.11, Fis 607.05 or Fis 609.01 shall submit the following information to the executive director by the 10th of each month for the month previous, whether or not fishing occurred:

(1) On a monthly basis:

- a. Name;
- b. Signature of permittee subject to the penalties for unsworn false statements under RSA 641:3;
- c. Coastal harvest permit number;
- d. Month and year; and
- e. Whether fishing occurred that month.

(2) On a trip basis:

- a. Trip date;
- b. Dealer(s) name or license number(s) harvest was sold to;
- c. Trip number;
- d. Species harvested;
- e. Quantity or weight of species harvested;
- f. Disposition of harvested species;
- g. Type and quantity of gear;
- h. Hours gear fished or harvest time;
- i. Size of gear;

- j. Area of fishing activity;
- k. Number of gear fished;
- l. Port, county, state landed, if harvest sold;
- m. Vessel name;
- n. State vessel registration number, USCG documentation number, or National Marine Fisheries permit number; and
- o. Unloading date, if harvest sold.

(b) Any permittee failing to report pursuant to Fis 608.02(a) and (b) shall not be issued a permit until such time that the required information is submitted. Before a permit is issued the information shall be reviewed by the department for completeness and information validated.

Source. #1878, eff 12-4-81; ss by #2839, eff 8-31-84; ss by #4868, eff 7-20-90; ss by #4868, eff 7-20-90; ss by #5789, eff 2-18-94; amd by #6176, eff 1-27-96; ss by #7215, eff 3-16-00; ss by #8302, eff 4-1-05; ss by #8819, EXEMPT, eff 2-1-07

Fis 609.01 Harvest Permit

(a) No person shall take finfish by the use of a seine, net, weir, pot or trap, American eels as specified in Fis 603.11, or horseshoe crabs as specified in Fis 607.05 from coastal and estuarine waters without first obtaining a permit from the executive director, except those persons taking finfish in accordance with RSA 211:48, or RSA 211:49-a or 211:49-b and are reporting catch under the National Marine Fisheries weigh-out program.

(b) The applicant shall provide:

(1) The applicant's:

- a. Name and maiden name if applicable;
- b. Street and mailing address;
- c. Date of birth;
- d. Telephone number;
- e. Height and weight; and

f. Hair and eye color; and

g. Signature of permittee subject to the penalties for unsworn false statements under RSA 641:3.

(2) The type, size, and number of gear fished or used to harvest;

(3) The specific location(s) where fishing activity or harvesting will occur;

(4) Species sought;

(5) Specific months the permittee intends to fish or harvest;

(6) If the applicant is not the vessel owner, the following vessel owner information:

a. Name and address; and

b. Home telephone number.

(7) The following vessel information:

a. Vessel name;

b. State of registration;

c. State registration or coast guard number;

d. National Marine Fisheries Service federal permit number;

e. Principal port;

f. Hull ID number;

g. Hull construction material;

h. Vessel length;

i. Year built;

j. Gross and net tons, if federally documented vessel;

k. Horsepower, if federally documented vessel;

l. Hold capacity in tons, if federally documented vessel; and

m. Crew size.

(c) A helper may assist the permittee as long as the permittee is present.

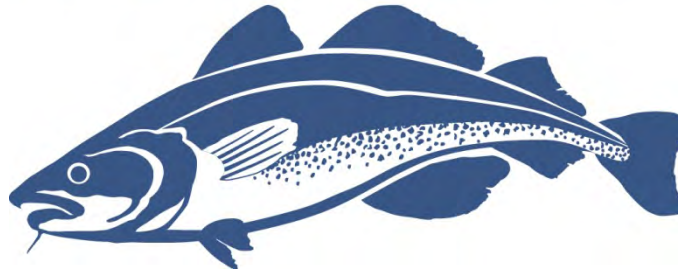
(d) A ny person possessing a permit shall file with the director the report as required in Fis 608.02.

Source. #1878, eff 12-4-81; ss by #2839, eff 8-31-84; ss by #4868, eff 7-20-90; ss by #5789, eff 2-18-94, EXPIRED: 2-18-00

New. #7215, eff 3-16-00; amd by #7371, eff 10-7-00; ss by #8819, EXEMPT, eff 2-1-07

Marine Fisheries

Commonwealth of Massachusetts



MASSACHUSETTS AMERICAN EEL COMPLIANCE REPORT: 2012

To The

ATLANTIC STATES MARINE FISHERIES COMMISSION

October 2013

Prepared by

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Massachusetts American Eel Compliance Report: 2012

I. Introduction

This document serves as the Massachusetts Division of Marine Fisheries (*Marine Fisheries*) annual compliance report to the Atlantic States Marine Fisheries Commission (ASMFC) required by Section 5.1.2 of the 2000 Interstate Fishery Management Plan (FMP) for American Eel.

There were no significant changes in American eel regulations or harvest in 2012. Monitoring continued at three young-of-the-year (YOY) Sheldon trap stations. Massachusetts has no commercial fishery for YOY or silver eels. The Massachusetts eel fishery targets yellow eels for both food and bait. From 1950 through the early 1990s, the reported yellow eel fishery landings averaged about 30,000 pounds annually with the exception of a nine year period (1974-1982) with an average of 280,000 lbs when the export eel market prompted higher harvest (Figure 1). Eel landings declined to a range of 2,000-6,000 lbs per year from 1993 to 2008. Since 2009, the eel fishery has declined further to historic lows with landings of 277 lbs in 2010, 368 lbs in 2011, and 462 lbs in 2012.

II. Request for de *minimus status*

Massachusetts requested and was granted de minimus status in October 2001. Massachusetts wishes to maintain that status based on current landings.

III. 2012 Fishery and Management Program

A. Commercial Fishery

1. State Law Massachusetts General Laws Chapter 130 section 100D

100D. Regulation of Eel Fishing: Violations and Penalties. No person shall take or attempt to take eels, *Anguilla rostrata*, by any contrivance other than by nets, pots, spears, or angling. The director is hereby authorized to establish rules and regulations governing the size, shape, mesh size, and manner of marking such nets or pots. It shall be unlawful for a person to possess elvers or eels of a size less than six inches total length. Whoever violates any provision of this section shall be punished by a fine of not less than one hundred dollars or by imprisonment for not more than 30 days, or both.

2. State Regulations Code of Massachusetts Regulations 322 CMR: Division of Marine Fisheries

6.30: American Eels (effective January 2005)

(1) Permit. It shall be unlawful for any person to take or land American eels (*Anguilla rostrata*) for commercial purposes without a regulated fishery permit issued by the Director.

(2) Reporting. Each holder of a regulated fishery permit for American eels shall file an annual catch report on forms supplied by the Division. Failure to report shall be grounds for suspension and non-renewal of the permit.

(3) Dealers. Wholesale Dealers who purchase American eels from licensed fishermen shall register with the Division and keep records of purchases on forms supplied by the Division.

(4) Minimum Size. It is unlawful for any person to fish for, take, or have in possession American eels measuring less than six inches in total length unless authorized by a special permit issued by the Director.

(5) Non-Commercial Harvest Limit. It shall be unlawful for any person to harvest more than 50 eels per calendar day for personal use, or possess more than 50 eels while eel fishing, unless said person holds a regulated fishery permit for American eel.

(6) Prohibited Fishing Gear. During the period February 15 through June 15, it shall be unlawful for any person, while in or on the waters of or upon the banks of streams or rivers within the coastal waters, to possess or have under his/her control any device with a mesh or or openings measuring less than 1/8 inch, including but not limited to dip nets, set nets, and traps adapted to the taking of elvers, or to leave any such gear in said areas during the closed season.

3. License

A commercial fishery permit is required to sell any species of fish. In addition, a regulated fishery permit (322CMR) is required to sell eels, and annual catch reports are required.

4. Town Regulations

Each of the 52 coastal cities and towns may established their own regulations within the restrictions of Chapter 130 section 100D and 322CMR 6.30. These regulations typically address catch limits, number of pots, and gear marking. Some municipalities require a local permit to take eels.

5. Commercial Landings

In 2012, 142 commercial eel permits were issued and the total landings of 462 pounds were reported by seven fishermen (Tables 2-4). The 142 commercial permits is the highest number of annual permits issued during FMP reporting. A total of 115 permits holders reported that they did not fish for eel, and 20 either did not report or had incomplete reports. There appears to be recent trends of declining harvest and sale of eel for food markets and a negative bias in total landings as some fishermen are not reporting catches used personally for striped bass bait under the false interpretation that only eels sold must be reported. However, the sharp decline in landings during 2010-2012 (Figure 2, and Table 1) appears to be most influenced by reduced fishing effort in response to low eel abundance.

6. Dealer Reports

Commercial fish dealers who buy eels from Massachusetts fishermen must receive a primary buyer authorization and report all transactions. The reporting system for commercial eel transactions switched in 2008 from eel biologist management to centralize seafood transaction reporting (SAFIS). Further, in 2010 trip level reporting was required and *Marine Fisheries* catch reporting was synchronized with the NMFS commercial fisheries reporting process. Presently, all eel dealers and harvesters must report transactions within the same reporting system that allows correlation of the origin and destination of eel harvest.

7. **Estimates of export** - 0 lbs (no evidence of exports).

B. Recreational Fishery

1. State Law

Massachusetts General Laws
Chapter 130 section 100D

100D. Regulation of Eel Fishing: Violations and Penalties. No person shall take or attempt to take eels (*Anguilla rostrata*) by any contrivance other than by nets, pots, spears, or angling. The director is hereby authorized to establish rules and regulations governing the size, shape, mesh size, and manner of marking such nets or pots. It shall be unlawful for a person to possess elvers or eels of a size less than six inches total length. Whoever violates any provision of this section shall be punished by a fine of not less than one hundred dollars or by imprisonment for not more than 30 days, or both.

2. State Regulations

Code of Massachusetts Regulations
322 CMR: Division of Marine Fisheries

6.30: American Eels (effective January 2005)

(1) Permit. It shall be unlawful for any person to take or land American eels (*Anguilla rostrata*) for commercial purposes without a regulated fishery permit issued by the Director.

(2) Reporting. Each holder of a regulated fishery permit for American eels shall file an annual catch report on forms supplied by the Division. Failure to report shall be grounds for suspension and non-renewal of the permit.

(3) Dealers. Wholesale Dealers who purchase American eels from licensed fishermen shall register with the Division and keep records of purchases on forms supplied by the Division.

(4) Minimum Size. It is unlawful for any person to fish for, take, or have in possession American eels measuring less than six inches in total length unless authorized by a special permit issued by the Director.

(5) Non-Commercial Harvest Limit. It shall be unlawful for any person to harvest more than 50 eels per calendar day for personal use, or possess more than 50 eels while eel fishing, unless said person holds a regulated fishery permit for American eel.

(6) Prohibited Fishing Gear. During the period February 15 through June 15, it shall be unlawful for any person, while in or on the waters of or upon the banks of streams or rivers within the coastal waters, to possess or have under his/her control any device with a mesh or or openings measuring less than 1/8 inch, including but not limited to dip nets, set nets, and traps adapted to the taking of elvers, or to leave any such gear in said areas during the closed season.

3. Town Regulations:

Each coastal city and town may establish their own regulations within the restrictions of Chapter 130 section 100D and 322CMR 6.30. These regulations may address catch limits, number of pots, and gear marking. Some municipalities require a local permit to take eels. A survey was initiated in the summer of 2011 to update the status of Town-specific regulations and to reach out to coordinate over potential eel habitat, passage and population restoration. Of 47 towns contacted with two survey notices, only 12 responded (26%). Only three towns reported

having commercial fishing regulations and none had reporting requirements. Four had recreational fishing regulations with enhanced conservation measures over state regulations. The survey did generate the sentiment that interest and activity in eel fishing had declined to very low levels in the last 10-15 years.

4. Landings as reported by MRFSS: None reported for 2012. Recreational American eel catches reported for MA has been zero in most years since the eel FMP was initiated in 2000.

C. Fishery Independent Monitoring

1. Young-of-the-Year (YOY) Abundance Survey:

A YOY Abundance Survey was conducted in the Jones River, Parker River, and Acushnet River using Sheldon elver traps in 2012. The Jones River survey has been conducted since 2001, and the Parker River and Acushnet River stations were added in 2004 and 2005, respectively. A Sheldon trap was sampled at the Saugus River during 2005-2010, but was discontinued for the 2011 season. Concerns had been previously raised over the data quality and utility of the Saugus River station as a long-term index of abundance series. The sampling season targets 10 weeks for all stations from the last week of March to the first week of June. The trap is set on a Monday and hauled Tuesday-Friday for four hauls each week.

Jones River, Kingston. The Jones River trap was successfully sampled in 2012 for the 12th year in the data series (Table 5). The YOY monitoring ran for 11 weeks in 2012 due to continued catches in early June. Thirty-nine of 44 potential hauls were made over the 11 week season. A total of 11,904 YOY and 95 age-1+ eels were caught in 2012. Two catch peaks were recorded in mid-April and mid-May that included a large majority of the season's total catch (Table 5). The 2012 YOY catch rates were very similar to that in 2011 and close to the series mean. Overall, the 12 year data series is showing a fairly flat trend that may be declining slightly (Figure 3). The Jones River YOY data series was evaluated by the 2011-2012 ASMFC American eel stock assessment and accepted as a fishery-independent index of glass eel abundance; one of only three accepted for this purpose from New England for the stock assessment (ASMFC 2012).

Parker River, Newbury. The Parker River trap has been fished consistently 2005-2012 after a 2004 pilot season with several trap locations changes. The YOY eel catch was 12,879 during 35 hauls in 2012 (Table 6). This catch was the highest in the data series in terms of geometric mean for April/May and 3rd highest in terms of total YOY numbers, and nominal CPUE (YOY catch/hour set). The YOY catch at this station has fluctuated widely during the eight year time series. There is concern that eel availability to trapping is strongly influenced by flow at the road culvert. Higher flows combined with the steep slope at the narrow culvert may limit or delay the passage of YOY eels to location of the Sheldon trap. Monitoring at this station will be continued in 2014 with analyses conducted to investigate the utility of the data series as an index of abundance.

Acushnet River, Acushnet. The Acushnet River was sampled over an 11 week season from mid-March to mid-May in 2012. Two Sheldon traps were set in the Acushnet River, one downstream a former dam where a nature-like fishway was constructed in 2007, and one in the spillway of an upstream reservoir dam. Both have been sampled since 2005. In 2010, the downstream Sawmill station was adopted as an annual YOY survey for ASMFC YOY monitoring. The Sawmill station caught 2,158 YOY eels in 2012 during 45 hauls. The total catch and CPUE declined in 2012 from a series in high in 2012 after consistent increases since 2007. The Reservoir station routinely catches low numbers of YOY eels (typically <100) and usually

higher numbers of age-1+ eels. The reservoir station caught only 2 YOY eels and 121 age-1+ eels in 2012. The Acushnet River monitoring was cooperatively funded by the National Marine Fisheries Service under a grant that covered 2005-2011 monitoring. In 2012, the site was maintained using *Marine Fisheries* staff and funding.

2. Juvenile Eel Monitoring at Eel Passageways:

Saugus River Eel Ramp. An eel ramp was installed at the first dam upstream of the Iron Works in the spring of 2007. Stream flow exits the head pond through a bottom opening sluiceway in the dam that is impassable for eels. The ramp was designed by Alex Haro of the USGS Conte Laboratory and constructed and installed by *Marine Fisheries* with funding support from the Gulf of Maine Council. The ramp tank catches of eels were monitored by the Saugus River Watershed Council and represent a census of eels passing over the dam. The 2012 ramp data is not available at the time of reporting. The ramp catch for 2012 was said to be in the range of catches for 2007-2011 (6,353 – 11,873). In the six years of operation the eel ramp has had consistent numbers age-1+ eels in the size range of 8-20 cm.

3. By-catch in Smelt Fyke Net:

A DMF annual project began in 2004 to monitor rainbow smelt (*Osmerus mordax*) populations using fyke nets at four coastal rivers (Jones, Fore, North, and Parker rivers) in Massachusetts. The nets are set 3 nights a week during March-May. The by-catch of American eel in the fyke nets presently provides the only fisheries independent data on yellow eels in Massachusetts, and may provide useful catch-per-unit-effort and size composition data. The total catch of eels at these four stations has ranged from about 100-200 since 2004. Four additional fyke net stations have been monitored since 2005. Eel catches peak in May and few eels are seen in March or before water temperatures reach 10 °C. The eel length range for 2004-2012 was approximately 15-90 cm. The Fore River station has had the highest eel by-catch in most years. In 2012, the Fore River eel by-catch for April/May decreased for the first time in seven years after a series high catch in 2012 (Figure 3). However, when including March catches, the total catches were similar to 2012. This is due to a warm winter that influenced early eel movements, resulting in 33 eels caught in March. No eels were caught in March during 2004-2010 and two were caught in 2011. The Fore River and Jones River (Figure 4) data series were evaluated as potential fishery-independent indices of yellow eel abundance during the 2011-2012 ASMFC American eel stock assessment. The data series were not accepted by the assessment due to their brevity but they were reported as potential data series for the next stock assessment (ASMFC 2012).

4. Massachusetts Resource Assessment Trawl Survey:

A state-waters trawl survey has been conducted off the Massachusetts coast with a 65' stern trawler conducting 20 minute tows since 1978. The trawl net has a 51 ft. footrope, 39 ft. headrope and ¼ inch mesh codend liner. Incidental catches (1-4 eels per year) of American eels were made south of Cape Cod during most of the first 10 years of the survey. No American eel catches have been made at any station in this survey since 1996.

D. Research Harvest

The University of Massachusetts, Dartmouth, is permitted to harvest silver eels to support ongoing research on age and growth. A fyke net is typically deployed in October to harvest silver

eels in the Paskamansett River in Dartmouth. The collection in 2011 was 130 silver eels of which 105 were retained. The approximate total weight of the sample was 13 lbs (0.05 kg per male). The sample collection data for 2012 is not available at the time of reporting, but was said to be less than the 2012 collection. The Paskamansett River has been monitored now for over 10 seasons with a sex ratio dominated by males (95-97% each year).

E. Impingement/Entrainment Mortality

Records on power plant mortality were first investigated in 2006 for the American eel compliance report. There are seven power plants in coastal Massachusetts that have National Pollution Discharge Elimination System (NPDES) permit requirements to monitor fish impingement and entrainment. The records reviewed for two plants (Salem and Plymouth) indicate that eel impingement and entrainment is not likely a large source of eel mortality. No additional information was received or reviewed in 2012.

F. Fish Kill Events

No reports of fish kills that included American eel were received by DMF in 2012.

G. Inland Eel Harvest.

American eel are regulated in MA by the Division of Marine Fisheries in coastal waters up to the first dam or the upstream limit of tidal influence and by the Division of Fish and Wildlife for inland waters. The Division of Fish and Wildlife issued three permits for commercial harvest of American eel in inland waters in 2012 and recorded no harvest.

IV. Planned Management Program for Current Calendar Year.

- A. Regulation changes are expected for 2013 in response to the ASMFC Addendum III to the 2000 Interstate Fishery Management Plan for American Eel. Concern has grown over the problem of glass eel poaching by out-of-state fishermen and discussions are expected on increasing enforcement capabilities and fines for noncompliance.
 1. **Commercial fishery.** A focused effort was made during 2004-2006 to improve the poor reporting of annual catch reports that occurred during the first few years of the eel FMP. This effort improved permit reporting during 2006-2008 to high percentages of compliance. A major change to commercial fishery monitoring occurred in 2008 as all permit holders reported directly to our Boston permit office. From 2000-2007, eel fishermen sent paper catch reports DMF's eel biologist. The change in reporting will bring the eel fishery into the same system (SAFIS) as all other commercial fisheries and improve data quality by correlating fishery reports to eel dealer reports. The very low harvest reported in 2010-2012 is an ongoing concern that will continue to be investigated via phone contact with permit holders.
 2. **Dealer Reporting.** Investigations during 2005-2007 found poor correlation between commercial fishermen catch reporting and dealer reporting. In 2006, we eliminated the independent eel dealer authorization maintained by DMF's eel biologist and required that all eel purchases from fishermen be made by a primary buyer and reported within our Dealer Reporting Program (SAFIS) that serves all seafood transactions. Efforts were made to education fishery participants of this change in 2007 and by 2008 the process was fully incorporated with the SAFIS reporting system. Effort is still needed to improve

dealer reporting, and dealer and harvest records will be correlated to identify discrepancies. With time this system should improve data quality for the harvest and sale of American eel.

- 3. Fishery Independent Monitoring.** The YOY Survey will be conducted during the spring of 2013 in the Jones River, Parker River, and Acushnet River with no changes to sampling protocols. The minimum sampling period for all stations was increased to 10 weeks in 2007 and will be maintained in 2012. A major effort of recent years to standardize field data collection at each station was completed in 2009 and the Jones River datafile was audited through 2010 in 2011. Work will continue in 2013 to update and audit the Parker River and Acushnet River datafiles. Next steps include data audits and the conversion of Excel datafiles to a standardized Access database developed by ASMFC. The annual rainbow smelt fyke net survey will continue in 2013 and eel bycatch will be counted and measured.
- 4. Eel Passage Restoration.** The Saugus River eel ramp installed in 2007 was the first such eel passageway deployed in a Massachusetts coastal river. Since 2007, *Marine Fisheries* has sought to install one eel pass per year in cooperation with property owners and project partners. A pump-supply ramp was installed in Cold Brook, Harwich, in 2008 and is monitored by the Town of Harwich and the Harwich Conservation Trust. A piped, gravity flow eel pass was installed in the Wankinco River, Wareham, in 2009 with project partners A.D. Makepeace and the Town of Wareham. A floating gravity flow eel pass was installed at Pilgrim Lake, Orleans, in 2010 and is managed with the Town of Orleans. A concrete-form, pump supply eel ramp was installed during the Mystic Lakes Dam reconstruction by the MA Department of Conservation in Medford during 2011 and is monitored by the Mystic River Watershed Association. Two eel ramps were designed and partially constructed in 2012 (Morey's Street Dam, Mill River, Taunton; and Mill Pond Dam, Rockport) but were not operational until the spring of 2013. Efforts will continue to locate sites where improved eel passage is essential and to identify monitoring opportunities that could provide long-term indices of abundance.

Citations

ASMFC, 2012. American eel benchmark stock assessment. Atlantic States Marine Fisheries Commission, Stock Assessment Report No. 12-01.

Acknowledgements

The Division of Marine Fisheries efforts with American eel are supported by the Sportfish Restoration Act and the following staff. John Boardman, Matt Ayer, Chris Wood, John Sheppard, Ben Gahagan, Mike Bednarski, Andrea Petrilla, and Maria Piraino maintained the YOY eel trap stations during 2012 and assisted with YOY catch data entry. Ed Clark and Louis Carmo construct and maintain the Sheldon eel traps. Chris Wood, Andrea Petrilla, and Maria Piraino assisted with YOY data entry and processing. Brad Chase conducted data audits and quality assurance review on YOY catch and commercial catch data. Brant MacAfee summarized datafiles on commercial fishermen and dealer reporting. The Saugus River Watershed Council led the monitoring of the Saugus River eel ramp. Bob Arini of the *MassWildlife* reported on eels for MA inland waters. Dr. Ken Oliveira provided the research harvest data from the University of Massachusetts, Dartmouth.

Figure 1. Massachusetts commercial American eel landings reported for 1950 to 2012.

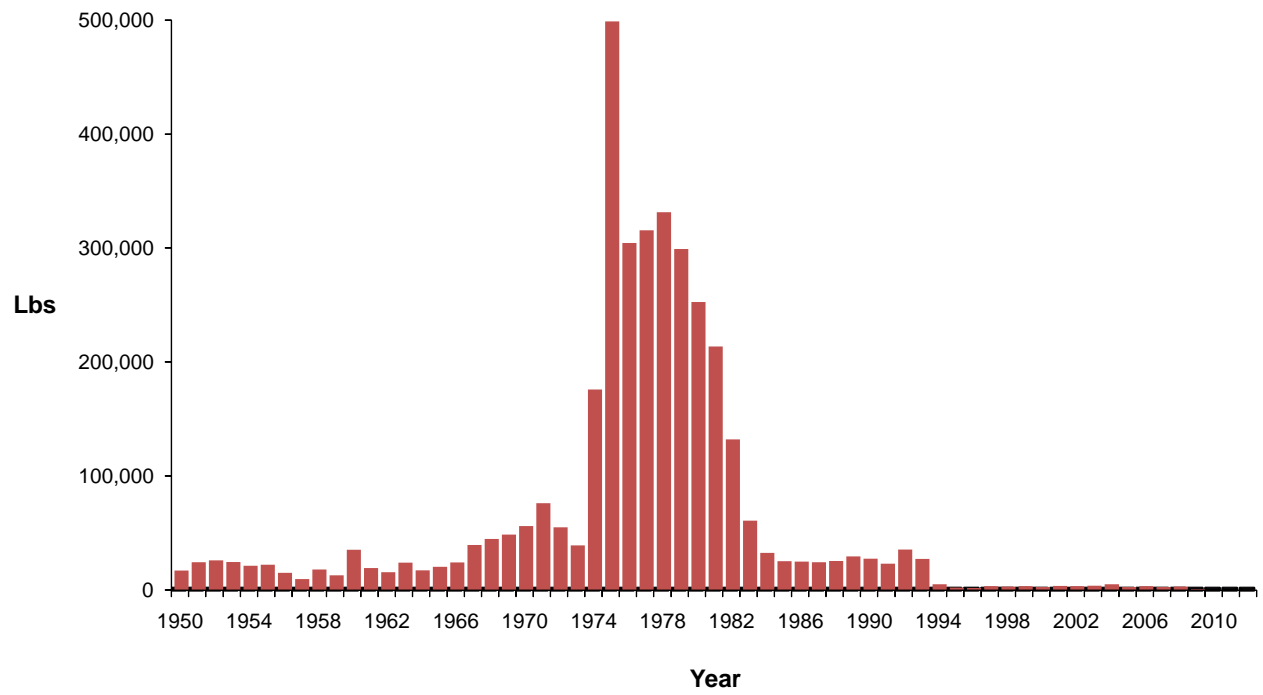


Figure 2. Commercial harvest of American eel reported to MADMF, 2000-2012; with annual permit numbers in columns.

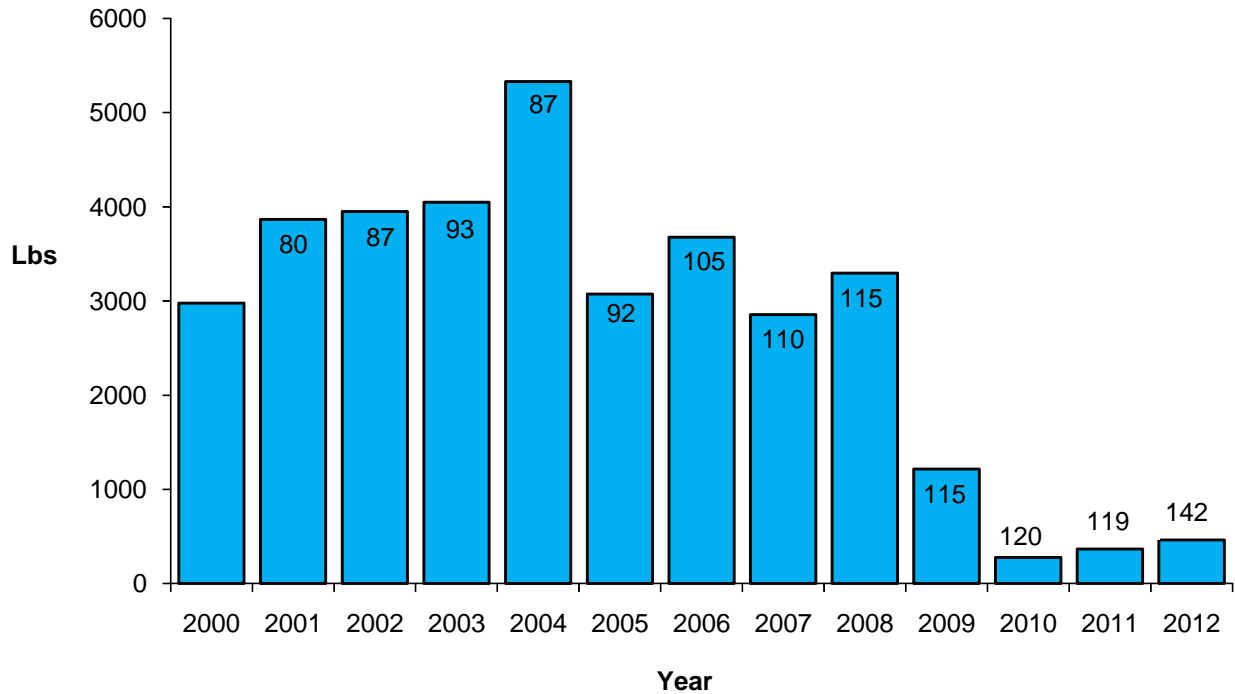


Table 1. Commercial harvest of American eel by month reported to MADMF, 2002-2012.

Month	2002 (lbs.)	2003 (lbs.)	2004 (lbs.)	2005 (lbs.)	2006 (lbs.)	2007 (lbs.)	2008 (lbs.)	2009 (lbs.)	2010 (lbs.)	2011 (lbs.)	2012 (lbs.)	Total Catch (lbs.)	Total Catch (%)
January		9	13			100						122	0.4
February		26										26	0.1
March		60										60	0.2
April		93		30	110	40	264			4	52	593	2.1
May	1330	1457	898	849	1246	703	1121	222	7	9	160	8002	28.3
June	1194	467	1550	736	764	751	1084	497	99	112	151	7405	26.2
July	359	330	1250	511	737	742	225.5	279	78	93	65	4670	16.5
August		95	1	264	446	389	137	101	85	138	14	1670	5.9
September	126			435	89	118	100	68		12		948	3.3
October	142		1172	248	284	10	365	50	2		9	2282	8.1
November	206	560	240						6		11	1023	3.6
December	32		37									69	0.2
Unspecified	325	950	167									1442	5.1
Total	3714	4047	5328	3073	3676	2853	3296.5	1217	277	368	462	28312	100.0

Massachusetts American Eel Commercial Catch -- 2012
Reported to the Massachusetts Division of Marine Fisheries.

(October - 2013)

Table 2. Commercial harvest of American eel in Massachusetts, 2012 Seven permit holders reported catches out of 142 permits. No catch reports were received for 10 permits. No fishing or no catch was reported by 125 permits.

Gear	Permits with Catch (No.)	Sold (lbs.)	Kept (lbs.)	Total (lbs.)
Pots	6	361	55	416
Rod and Reel	1	46		46
Spear	0			0
Total	7	407	55	462

Table 3. Commercial harvest of American eel by coastal region in Massachusetts, 2012.

Region	Permits with Catch (No.)	Sold/Food (lbs.)	Sold/Bait (lbs.)	Kept/Bait (lbs.)	Kept/Food (lbs.)	Total (lbs.)
Buzzards Bay						
Cape Cod						
South Shore						
Boston Harbor						
North Shore						
Merrimack River						
Total						

Not reported due to low reported harvest

Table 4. Commercial harvest of American eel by month in Massachusetts, 2012.

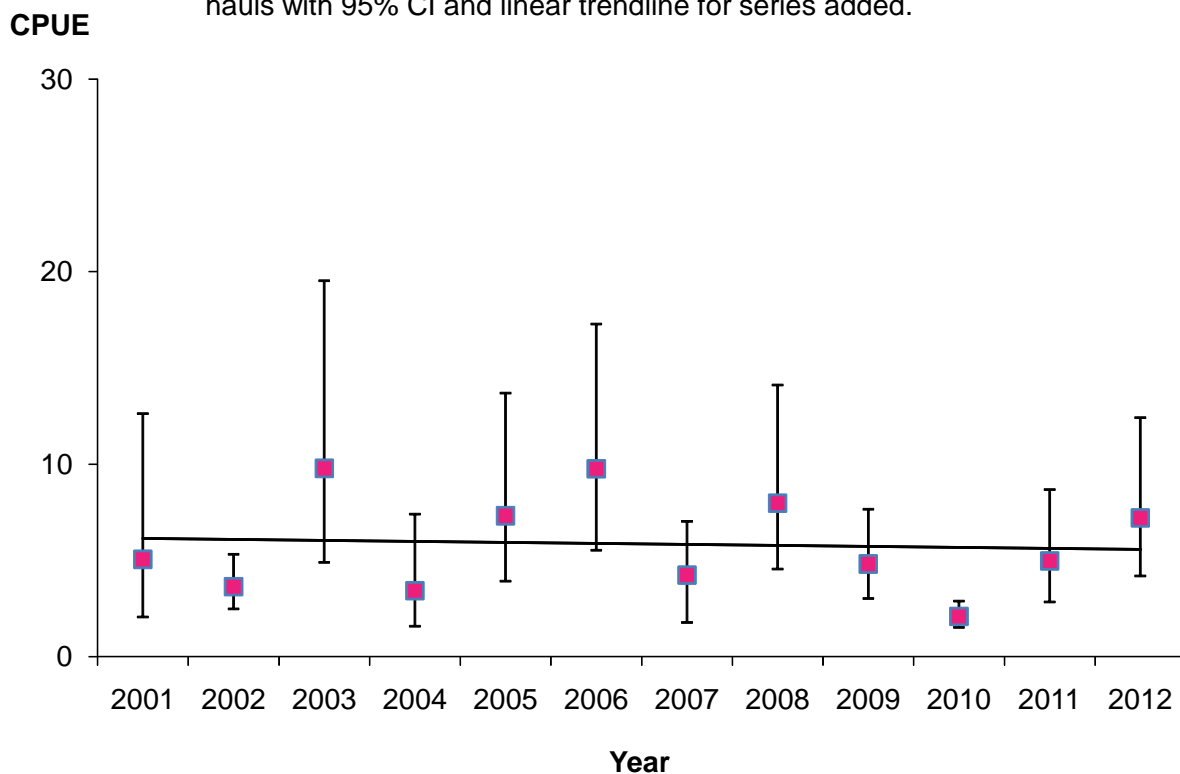
Month	Permits with Catch (No.)	Sold (lbs.)	Kept (lbs.)	Total (lbs.)
January				
February				
March				
April	2	52		52
May	5	160		160
June	3	151		151
July	3	10	55	65
August	1	14		14
September				
October	1	9		9
November	1	11		11
December				
Total		407	55	462

MASSACHUSETTS DIVISION OF MARINE FISHERIES

Table 5. Summary of YOY American eel monitoring in the Jones River, 2001-2012.

Year	Start Date	End Date	Total Hauls	Total Catch YOY	Total Catch Age-1	April/May Hauls (No.)	April/May Hauls (Targeted)	April/May Hauls (%)	April/May Mean CPUE	April/May Geometric CPUE
2001	3-Apr	16-May	22	16165	1	22	32	0.69	31.36	5.05
2002	2-Apr	24-May	31	4276	18	31	36	0.86	5.88	3.63
2003	15-Apr	13-Jun	32	19640	37	24	35	0.69	24.11	9.78
2004	30-Mar	4-Jun	17	2088	14	13	33	0.39	5.53	3.42
2005	6-Apr	7-Jun	34	20923	50	29	32	0.91	26.27	7.32
2006	3-Apr	2-Jun	30	19868	29	27	33	0.82	28.25	9.76
2007	26-Mar	8-Jun	37	19571	102	32	34	0.94	28.32	4.23
2008	25-Mar	6-Jun	40	17821	65	32	36	0.89	23.51	7.97
2009	30-Mar	5-Jun	36	8146	122	31	36	0.86	10.59	4.81
2010	4-Apr	4-Jun	32	1489	39	29	32	0.91	2.14	2.09
2011	28-Mar	10-Jun	42	12881	104	31	32	0.97	16.10	4.97
2012	26-Mar	8-Jun	39	11904	95	29	34	0.85	20.21	7.21

Figure 3. American eel YOY Sheldon trap catch in the Jones River, Kingston, MA, 2001-2012. Geometric mean catch per haul are shown for April and May hauls with 95% CI and linear trendline for series added.



MASSACHUSETTS DIVISION OF MARINE FISHERIES

Table 6. Summary of YOY American eel monitoring in the Parker River, 2004-2012.

Year	Start Date	End Date	Total Hauls	Total Catch YOY	Total Catch Age-1	April/May Hauls (No.)	April/May Hauls (Targeted)	April/May Hauls (%)	April/May Mean CPUE	April/May Geometric CPUE
2004	22-Mar	17-Jun	39	151	27	NA	NA	NA	NA	NA
2005	11-Apr	17-Jun	36	2737	516	27	34	0.79	55.22	1.84
2006	3-Apr	12-May	23	678	140	23	36	0.64	29.87	1.78
2007	2-Apr	1-Jun	30	2912	325	29	35	0.83	97.07	2.07
2008	24-Mar	6-Jun	43	20066	226	35	35	1.00	572.40	3.23
2009	30-Mar	12-Jun	43	803	11	34	34	1.00	22.26	1.47
2010	13-Apr	4-Jun	28	5368	233	25	34	0.74	214.72	2.66
2011	4-Apr	10-Jun	37	17038	414	29	32	0.91	585.24	4.73
2012	27-Mar	8-Jun	35	12879	184	27	35	0.77	473.00	6.10

Figure 4. American eel YOY Sheldon trap catch in the Parker River, Newbury, MA, 2005-2012. Geometric mean catch per haul are shown for April and May hauls with 95% CI and linear trendline for series added.

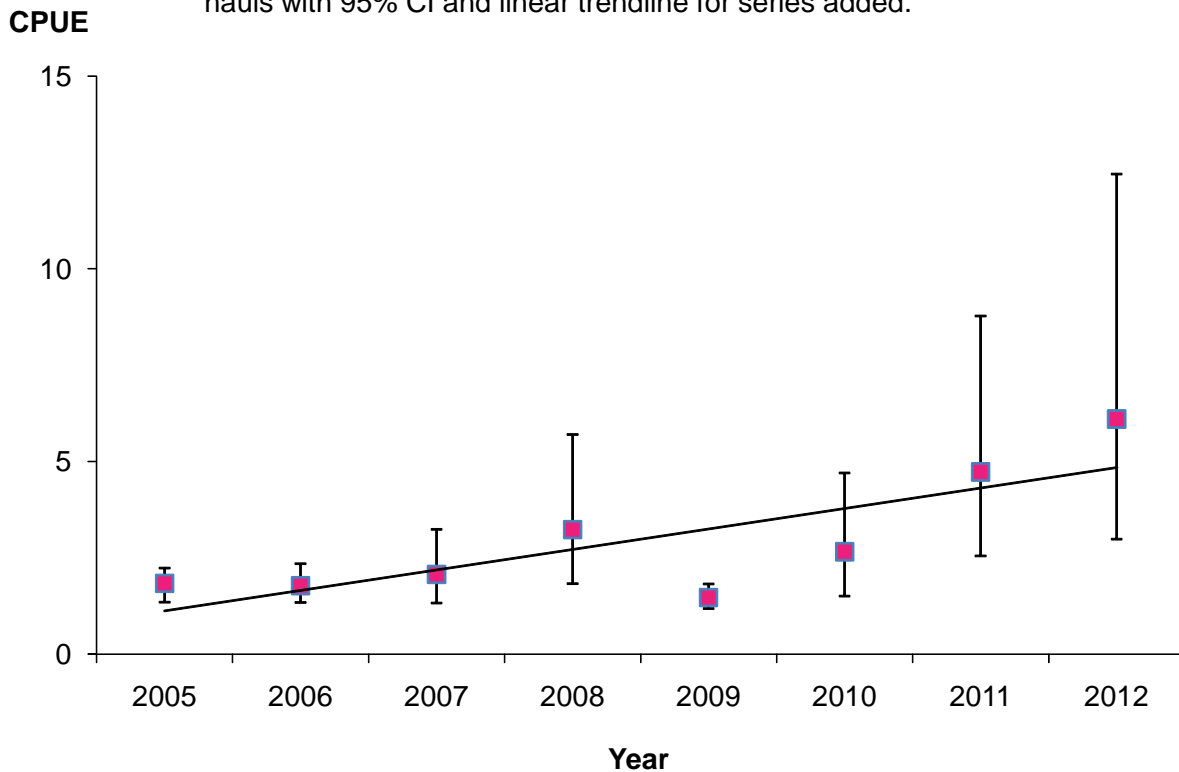


Figure 5. Yellow eel CPUE in the Fore River smelt fyke net catch, 2004-2012. Mean catch-per-haul for April/May hauls are graphed with 95% CI. Catch range is 39-139 eels per year. Size range is 14-85 cm.

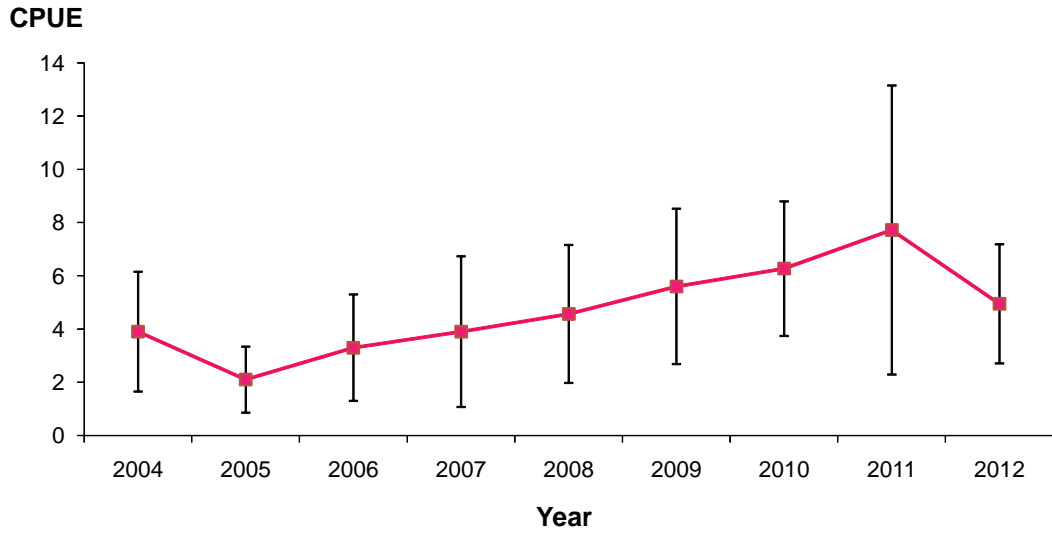
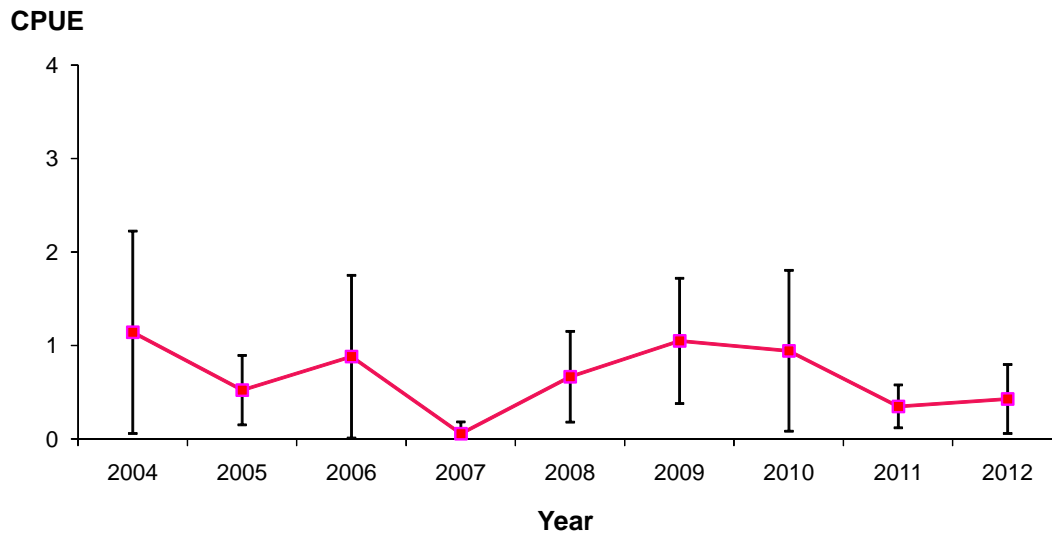
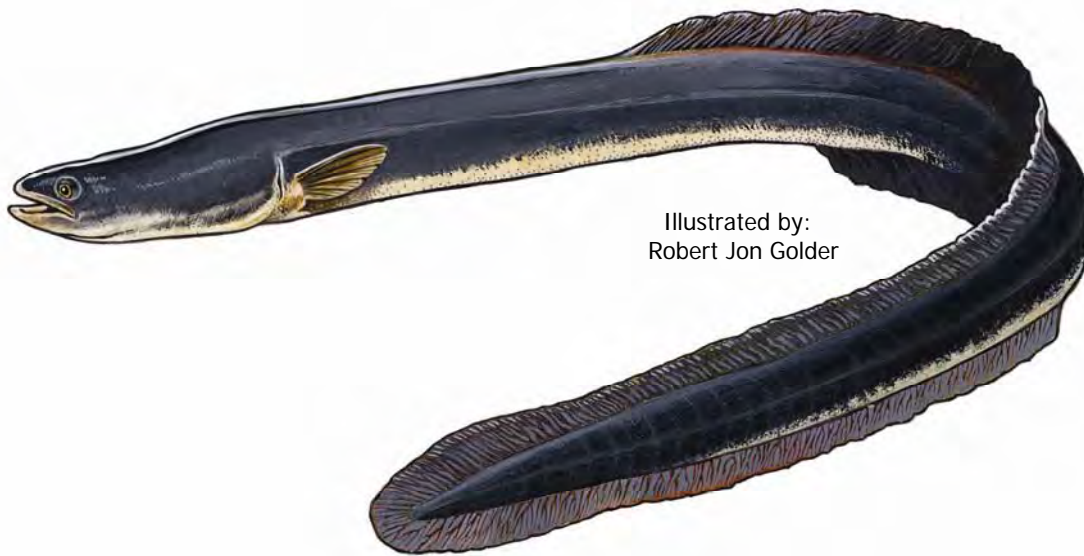


Figure 6. Yellow eel CPUE in the Jones River smelt fyke net catch, 2004-2012. Mean catch-per-haul for April/May hauls are graphed with 95% CI. Catch range is 1-21 eels per year. Size range is 12-68 cm.

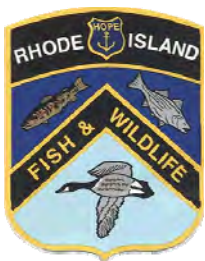


American Eel
ASMFC Annual Compliance Report
Calendar Year 2012



Illustrated by:
Robert Jon Golder

Submitted to ASMFC
September 2013
By Phil Edwards
RI DEM Fish & Wildlife



RI Department of Environmental Management / Fish & Wildlife
ASMFC Annual Compliance Report for American Eel
Calendar Year 2012

Report prepared by Phil Edwards
Submitted to ASMFC – September 2013

I. Introduction

A total of 5,041 young-of-the-year American eel were observed in RI's 2012 recruitment survey. Of those caught, 415 American eel were collected at Hamilton Fish Ladder on the Annaquatucket River, and 4,626 were collected at Gilbert Stuart Fish ladder on the Pettaquamscutt River. The number observed at Hamilton is significantly less than the number collected in RI's 2011 survey ($n_{2011} = 1,349$ young-of-the-year eels). The number observed at Gilbert Stuart is significantly lower than that which was observed in 2011 ($n_{2011} = 29,525$ young-of-the-year eels). Rhode Island Department of Fish & Wildlife beach seine surveys caught fourteen and the trawl survey caught one American eel in 2012.

There are very few directed commercial fisheries for eel in Rhode Island. Commercial fishers in RI landed 8,866 lbs, 4,855lbs, 4,642lbs, 1,521lbs and 1478lbs of American eel during 2008, 2009, 2010, 2011 and 2012 respectively (NMFS Fishery Statistics as of March 2013). Recreational fishers landed 5,954 lbs. \pm 84.3 S.E. of American eel in 2007, while no eels were reported between 2004 through 2006, and between 2008 through 2012 (Marine Fisheries Recreational Statistics Survey).

Rhode Island fishery regulations for American eel commercial and recreational fisheries are consistent with the minimum requirements for size restrictions and possession limits outlined in the Fishery Management Plan.

II. Request for *de minimis*, where applicable

The State of Rhode Island does not seek *de minimis* status.

III. Fishery and management program for 2012 calendar year

A. Activity and results of fishery dependent monitoring (provide general results and references to technical documentation).

The National Marine Fisheries Service (NMFS) port-sampling program provides fishery-dependent information characterizing the commercial harvest of American eel in Rhode Island. The data collected include pounds landed by month, area, gear type, and catch value. RI commercial eel landings are typically very small, so commercial landings statistics are limited and often designated as 'confidential', prohibiting disclosure to the general public.

Recreational data are collected by the Marine Fisheries Recreational Statistics Survey (MRFSS). Summary statistics can be grouped by year, wave (sampling wave), state, mode (i.e. type of fishing), and/or area (i.e. type of waterbody). The MRFSS estimates are divided into three catch types depending on availability for sampling: (1) observed harvest (Type A); (2) reported harvest (Type B1); and (3)

released alive – not observed (Type B2). Few American eel have been observed in RI recreational fisheries in recent years.

B. Activity and results of fishery independent monitoring.

There was an increase in the number of American eel observed in the RIDFW Marine Fisheries Section fishery-independent trawl and beach seine surveys in 2012. The state's survey of American eel recruitment was implemented in 2000; 2012 was the thirteenth year for RI's young-of-the-year survey. RI has sampled at the Gilbert Stuart dam in the Pettaquamscutt River since the survey's inception and plans to continue monitoring this site. An additional station was added during the 2004 sampling season and has been sampled each year since. This new station is located at Hamilton Fish Ladder on the Annaquatucket River in North Kingston, RI. A modified Irish elver ramp was used, similar to the one at Gilbert Stuart.

C. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the Fisheries Management Plan.

See Appendix for copy of Rhode Island's current regulations for management of American eel fisheries. The regulations as they exist now are the same as they were in calendar year 2007 (see Section IV -A of this report). These regulations meet the minimum required management measures for the recreational fishery as outlined in Section 4.1 of the ASMFC Fishery Management Plan for American eel; RI management regulations for American eel also meet the minimum required management measures for the commercial fishery as given in Section 4.2 of the FMP.

D. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

In 2012, Rhode Island commercial fishers landed 1,478 lbs. of American eel (NMFS Fishery Statistics). All 1,478 pounds harvested were by pots and traps.

In 2012, zero American eel were observed (Type A), used as bait, filleted, or discarded dead (Type B1), or caught and released alive (Type B2) by Rhode Island recreational anglers (NMFS Fishery Statistics).

E. Review of progress in implementing habitat recommendations.

A new self regulating eel ramp was operated and maintained in 2012 on the Pawcatuck River. Seven new eel ramps are currently being designed and planned for 2013 on the Blackstone, Saugatucket and Ten Mile Rivers.

IV. Planned management programs for the 2013 calendar year

A. Summarize regulations that will be in effect (copy of current regulations if different from III-C).

See Appendix for copy of Rhode Island's regulations for management of American Eel fisheries that will be in effect during calendar year 2013. The state of Rhode Island will maintain the regulations that were in effect in 2012 for the management of commercial and recreational fisheries for American eel in

calendar year 2013 (see also Section III-C and Sections V-A-1 and V-B-1 of this report).

B. Summarize monitoring programs that will be performed

The State of Rhode Island will continue to perform the mandated fishery-independent survey for young-of-the-year American eel at both stations in 2013.

C. Highlight any changes in 2012

A mandatory finfish logbook for commercial fisheries was implemented in 2007 for Rhode Island commercial fishers. This mandatory logbook will provide much needed American eel landings information, such as poundage, gear type and disposition.

V. Plan specific requirements

A. Commercial fishery

1. Synopsis of regulations in place

Minimum Size Limit: 6 inches total length

Possession Limit: No limit

Season Restrictions: None

2. Estimates of directed harvest, by month, by region as defined by the states

a. Pounds landed by life stage and gear type (defined in advance by ASMFC)

Not available.

Note: Information on life stage for commercial landings is not available. It is assumed that most, if not all, of commercially harvested American eel are adult-size.

b. Biological data taken from representative sub-samples to include sex ratio and age structure (for yellow/silver eels), length and weight if available

Not available.

c. Estimated percent of harvest going to food versus bait

It is estimated that virtually all of RI's commercially harvested American eel are shipped/sold for food.

3. Estimates of export by season (provided by dealers)

Not available.

4. Harvest data provided as CPUE (by life stage and gear type)

Not available.

5. Permitted catch for personal use, if available

Not available.

B. Recreational fishery

1. Synopsis of regulations in place

Minimum Size Limit: 6 inches total length

Possession Limit: 50 eel per person per day

Season Restrictions: None

2. Estimate of recreational harvest by season (if available)

There were zero pounds of American eel reported in Rhode Island for 2012 from the MRFSS online data query (NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD).

2012

Observed Harvest (Type A)

None

Reported Harvest (Type B1)

None

Released Alive (Type B2)

None

a. Biological data taken from representative sub-samples to include sex ratio, age structure, length and weight (if available)

MRFSS provides information on length and weight only for recreational harvest, which includes Types A and B1. Occasionally, weights and lengths are not available for the estimated harvest.

C. Fishery independent monitoring

1. Results of the Annual Young-of-Year Abundance Survey

a. Brief description of survey-methods

Young-of-the-year American eel were sampled at both stations using modified Irish elver ramps made of marine plywood and lined with filamentous plastic (Enkamat). The ramp at Gilbert Stuart is 10 feet in length and is secured to the dam parallel to existing fish ladder. The ramp allows juvenile eels to pass up and over a 53-inch high dam and into a collecting bucket. A steady stream of water is fed down the ramp using an electrical pump and spray bar. The Irish elver ramp at Hamilton is 4-feet in length, and does not allow eels to pass over the 9 foot dam. Rather, eels climbed up the ramp, where they then fell into a collection bucket. The

ramp at Hamilton, unlike Gilbert Stuart, is gravity fed using stopper boards and reinforced rubber hose. This eliminated the need for a power supply.

Eels collected at both stations were counted, measured and released above the dams. Measurements of individual lengths and weights were taken up to 60 fish weekly, when available. Length was measured to the nearest 0.1 mm and weight to the nearest 0.01 g. The following physical data was recorded each time the gear was checked; dissolved oxygen, soak time, moon phase, water level, and water temperature. The time of day and condition of gear were also noted. In 2012, the gear was deployed in late April and operated through mid-July. Gear was cleaned on a regular basis, which prevented failure during the sampling season.

b. Data by strata

i. Number units of effort (by sampling period)

(1) Number of animals (geometric mean) – by week (week beginning Sunday)

The geometric mean of young-of-the-year eel observed at Gilbert Stuart and Hamilton were calculated for each week of the sampling period (Table 1 & 2). The units are number of sampling days, as the gear was not checked every day of every week, and the number of days in which the gear was checked varied among weeks. Arithmetic averages are also presented for comparison.

(2) Length frequency, if available (at 1mm intervals)

The observed number of young-of-the-year eel at length (mm) for 2012 are presented in Figures 5a and 5b. Eels measuring >65mm are considered elvers. Eels collected and sub-sampled at Gilbert Stuart in 2012 were comprised of 86.1% glass eels and 13.9% elvers. Lengths ranged from 35mm to 160mm at Gilbert Stuart; with an average length of 61.6mm and a mode of 55mm (average includes all eels sub-sampled).

Juvenile eels collected at Hamilton were made up of 93.5 % glass eels and 6.5% elvers. This is a similar ratio to the 97.9% glass eels and 2.1% elvers collected in 2011. Lengths at Hamilton in 2012 ranged from 44mm to 107mm; with an average length of 56.3mm and mode of 53mm. Size frequencies corresponding to the glass eel and elver life stages are distinguished in Figure 2, where young-of-year eel >65mm are considered elvers.

(3) Weight, if available (nearest tenth of a gram) – by week

The observed number of young-of-the-year eel by weight (g) at both stations for 2012 are presented in Figures 6a and 6b. At Gilbert Stuart Fish Ladder, American eel weights ranged from 0.05g to 5.83g, with an average weight of 0.32g and a mode of 0.12g. At Hamilton Fish Ladder, weights ranged from 0.07g to 1.29g with an average weight of 0.16g and a mode of 0.12g. The seasonal progression of pigmentation stage by week is displayed in Figures 10a & 10b.

(4) Pigmentation, if available – weekly distribution

Pigmentation by week is displayed in Figures 10a & 10b.

(5) Environmental, if available

Total precipitation during the twelve week sampling period in 2012 was 14.98 inches, which was similar compared to 13.74 recorded in 2011 (National Climatic Data Center).

(6) Fill in protocol – H₂O temp, moon phase, gear selectivity, H₂O level

In 2012 water temperatures at Gilbert Stuart fish ladder ranged from 13.1 °C to 23.5 °C. Similarly at Hamilton fish ladder on the Annaquatucket River, temperatures ranged from 13.5°C to 23.0°C. Figures 9a and 9b display the frequency of American eels collected compared to the temperature for both stations in 2012. Soak time, water temperature, water level, and moon phase data can be found in Figures 7 & 8. Figures 9a and 9b display the frequency of American eels collected compared to the temperature for both stations in 2012. Soak time, water temperature, water level, and moon phase data can be found in Figures 7 (Gilbert Stuart Fish Ladder) & 8 (Hamilton Fish Ladder).

ii. Number of units of effort by year – index over time

Pertinent information by year for both stations is presented in Tables 3 & 4. Included in these tables is the number of sampling days, start and end sampling dates, number of days fished, start and ending water temperature and total number of eels collected. The gear was not checked every day of every week and the number of days in which the gear was checked varied among weeks.

iii. Ancillary information

None.

2. Description of other fishery-independent surveys performed (methods, location, etc.) and results (Table 5).

RIDF&W Marine Fisheries Section Surveys

Trawl Survey: Survey implemented to monitor recreationally important finfish stocks in Narragansett Bay, Rhode Island Sound, and Block Island Sound.

2012 Survey: 1 eel observed.

Narragansett Bay Juvenile Finfish Beach Seine Survey: Survey samples monthly at 17 fixed stations in Narragansett Bay from June to October

2012 Survey: 0 eel observed.

Coastal Pond Beach Seine Survey: Survey takes monthly samples at 16 fixed stations within Rhode Island coastal ponds from May to October.

2012 Survey: 14 eel observed.

URI-GSO

Bottom-Trawl Survey: Long-time survey of fish and invertebrate abundance that samples weekly at two sites – one near Fox Island (Narragansett Bay) and one near Whale Rock (Rhode Island Sound).

2012 Survey: No eel observed.

3. Projects planned for next five years

It is recommended that the young-of-the-year eel study continue at Gilbert Stuart and Hamilton Fish Ladder. Additionally, for the past few years it has been recommended that eel passage begin to be incorporated with new fish ladder installations throughout the State. To that note, the very first steps to incorporating eel passage are being developed for new fish ladder installations at all three dams along the Ten Mile River (Omega Pond Dam, Hunts Mill Dam and Turner Reservoir), and on the four lower dams along the Blackstone River. Two new eel ramps were recently completed on the Woonasquatucket River and will be evaluated over the next few years. In addition, major modifications and new eel ramps are planned at the first two Denil fishways on the Saugatucket River. RI DEM/Fish & Wildlife is working with the Army Corps of Engineers, the Natural Resources Conservation Service, USFWS, NOAA, local watershed organizations, among others, to effectively incorporate eel passage for continuous migration in these waterbodies. The passage designs and permitting are currently being worked on and construction could begin in 2014. This will be a benchmark step in providing continuous navigable passage for American eel in the largest rivers in Rhode Island.

D. Characterization of Other Losses

Unknown.

Literature Cited

- Burnett, M.F. 2007. Assessment of the Young-of-Year Glass Eel Recruitment and Migration into the Freshwater River of Rhode Island. Federal Aid in Sportfish Restoration. F-61-R-14. Rhode Island Division of Fish & Wildlife. 19 p.
- Burnett, M.F. 2007. Rhode Island's 2007 ASMFC Annual Compliance Report for American Eel. Submitted September 2008. Rhode Island Division of Fish & Wildlife. 27 p.
- Edwards, P.E. 2011. Assessment of the Young-of-Year Glass Eel Recruitment and Migration into the Freshwater River of Rhode Island. Federal Aid in Sportfish Restoration. F-26-R-46. Rhode Island Division of Fish & Wildlife. 21 p.
- Edwards, P.E. 2011. Rhode Island's 2011 ASMFC Annual Compliance Report for American Eel. Submitted September 2011. Rhode Island Division of Fish & Wildlife. 24 p.

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- Figure 10a.** Pigmentation stages of eels, weeks 1-12 at Gilbert Stuart – 2012.
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Appendix

- A.** 2012 American eel regulations for the State of Rhode Island.
- B.** Raw data collected at Gilbert Stuart Fish Ladder 2012.
- C.** Raw data collected at Hamilton Fish Ladder 2012.

Table 1. Summary of observations for Rhode Island’s 2012 American eel young-of-the-year survey at Gilbert Stuart Fish Ladder. The total numbers and the geometric and arithmetic averages of the observed number of young-of-the-year eel are given for each week (week beginning Sunday) in the sampling period. The units for the computed averages are the number of sampling days, which are also given.

Gilbert Stuart 2012				
Week Beginning	Total Number Observed	Number Sampling Days	Geometric Mean	Arithmetic Mean
4/8/2012	387	6	54.89	64.50
4/15/2012	2602	6	420.16	433.67
4/22/2012	454	5	25.93	90.80
4/29/2012	54	4	6.69	10.80
5/6/2012	48	4	14.28	16.00
5/13/2012	73	4	12.68	18.25
5/20/2012	35	4	8.05	8.75
5/27/2012	477	5	69.79	95.40
6/3/2012	41	4	11.70	13.67
6/10/2012	213	4	37.18	53.25
6/17/2012	171	5	31.86	34.20
6/24/2012	71	3	14.89	23.67

Table 2. Summary of observations for the Rhode Island’s 2012 American eel young-of-the-year survey at Hamilton Fish Ladder. The total numbers and the geometric and arithmetic averages of the observed number of young-of-the-year eel are given for each week (week beginning Sunday) in the sampling period. The units for the computed averages are the number of sampling days, which are also given.

Hamilton 2012				
Week Beginning	Total Number Observed	Number Sampling Days	Geometric Mean	Arithmetic Mean
4/8/2012	0	6	0.00	0.00
4/15/2012	42	5	6.87	14.00
4/22/2012	42	4	42.00	42.00
4/29/2012	2	5	2.00	2.00
5/6/2012	24	4	7.56	8.00
5/13/2012	90	4	19.21	22.50
5/20/2012	65	4	9.80	16.25
5/27/2012	83	5	14.14	20.75
6/3/2012	1	5	1.00	1.00
6/10/2012	24	4	5.09	8.00
6/17/2012	27	4	4.79	6.75
6/24/2012	15	3	3.42	5.00

Table 3. Important dates and data observed by year since the inception of Rhode Islands' young-of-the-year survey for American eel at Gilbert Stuart Fish Ladder.

Gilbert Stuart Fish Ladder-Narrow River													
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sampling start date	4/4	4/4	3/20	5/7	4/22	4/10	4/9	4/22	4/13	4/12	4/16	4/10	4/8
Sampling end date	5/25	6/15	5/24	6/14	7/15	7/2	7/1	7/14	7/5	7/4	7/2	7/2	6/30
Number of days sampled	31	44	36	23	79	66	49	55	40	36	42	64	54
Total days fished	51	72	64	38	84	83	83	84	84	84	78	84	84
Start water temperature	12.8	8.5	6.2	14.5	13.8	8.6	8.6	12.1	10	9	13.8	11.3	13.1
End water temperature	19	22.3	19	17.7	21.6	24	23.1	28.6	27.8	22.5	23.8	23.7	23.5
Total number of eels collected (glass & elver)	16,886	1,525	14,433	62	1,023	2,608	622	3,404	1,301	1,775	2,887	29,525	4,626

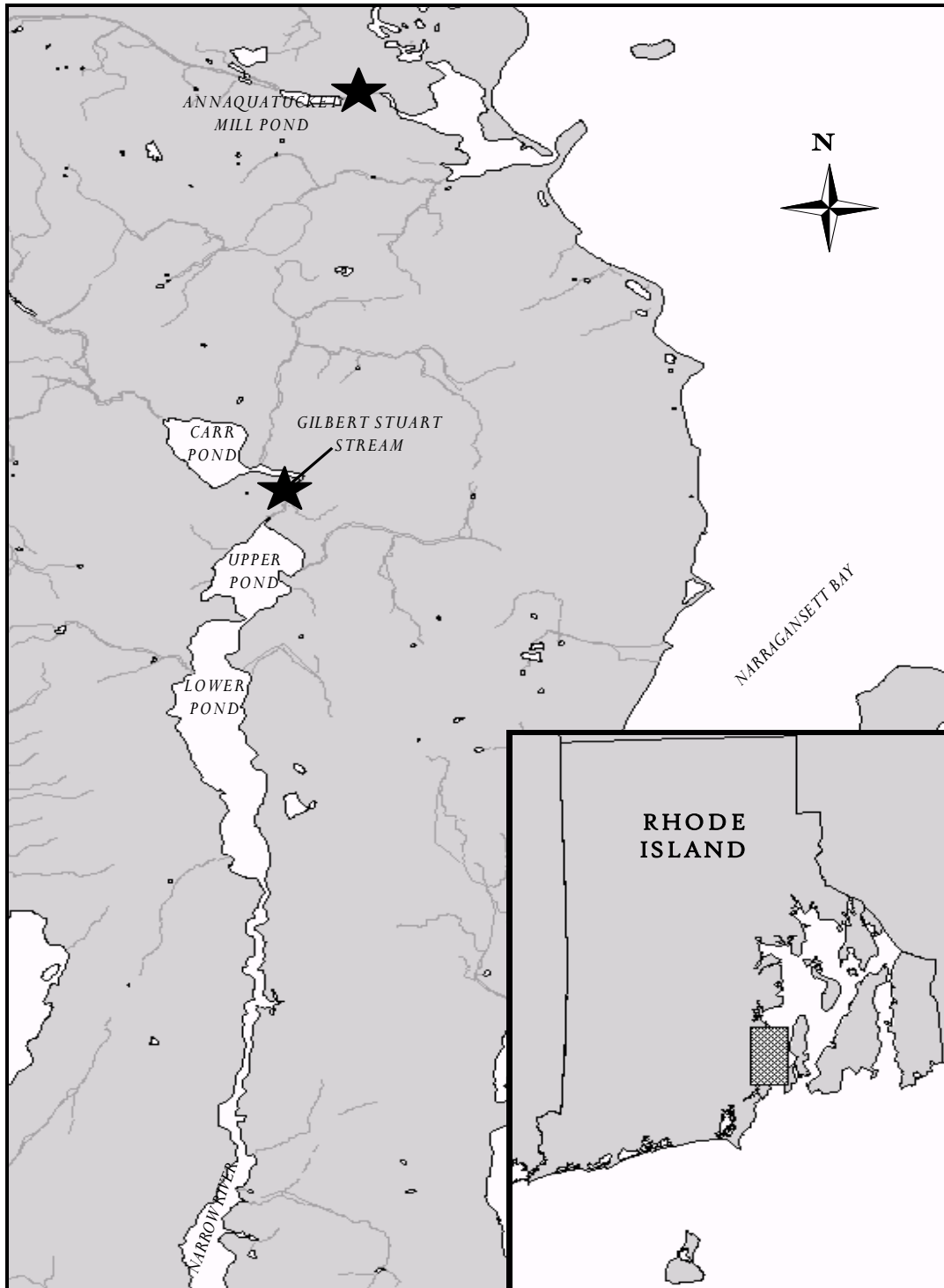
Table 4. Important dates and data observed by year since the inception of Rhode Islands' young-of-the-year survey for American eel at Hamilton Fish Ladder.

Hamilton Fish Ladder-Annaquatucket River										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Sampling start date	4/17	4/10	4/9	4/22	4/13	4/12	4/12	4/10	4/8	
Sampling end date	7/15	7/2	7/1	7/14	7/5	7/4	7/1	7/2	6/30	
Number of days sampled	83	69	49	54	39	32	45	52	53	
Total days fished	89	83	83	84	84	84	81	84	84	
Start water temperature	9.9	12.1	8.5	12.9	9.8	9	13	12.6	13.5	
End water temperature	21	23.1	23.2	28.6	25	22.8	22.1	22.5	23	
Total number of eels collected (glass & elver)	1,266	743	284	1,129	347	689	669	1349	415	

Table 5. Total number of eel observed in various projects since 2000.

Year	American Eel YOY Survey	Trawl Survey	Beach Seine Surveys	Commercial Landings (lbs)	Recreational Landings (lbs)	URI/GSO Trawl Survey
2000	16,875	0	6	25	0	0
2001	1,459	0	15	329	0	0
2002	14,374	1	47	237	65	1
2003	62 *	0	18	246	390	1
2004	2,289 **	0	3	971	0	0
2005	3,351**	2	12	0	0	0
2006	906**	0	29	1,034	0	0
2007	4,533**	0	10	1,230	6,017	0
2008	1,648**	1	5	8,866	0	0
2009	2,464**	1	11	4,855	0	0
2010	3,556**	1	16	4,642	0	0
2011	30,874**	1	7	1,521	0	0
2012	5,041**	1	14	1,478	0	-----
* Gear failure in 2003 contributed to the low catch frequency.						
** Both stations combined.						

Figure 1. Sampling stations for young-of-the-year eels at Gilbert Stuart Dam on the Pettaquamscutt River, and on the Annaquatucket River at Hamilton Fish Ladder.



Figures 2a and 2b. Detailed map of American eel ramp locations.

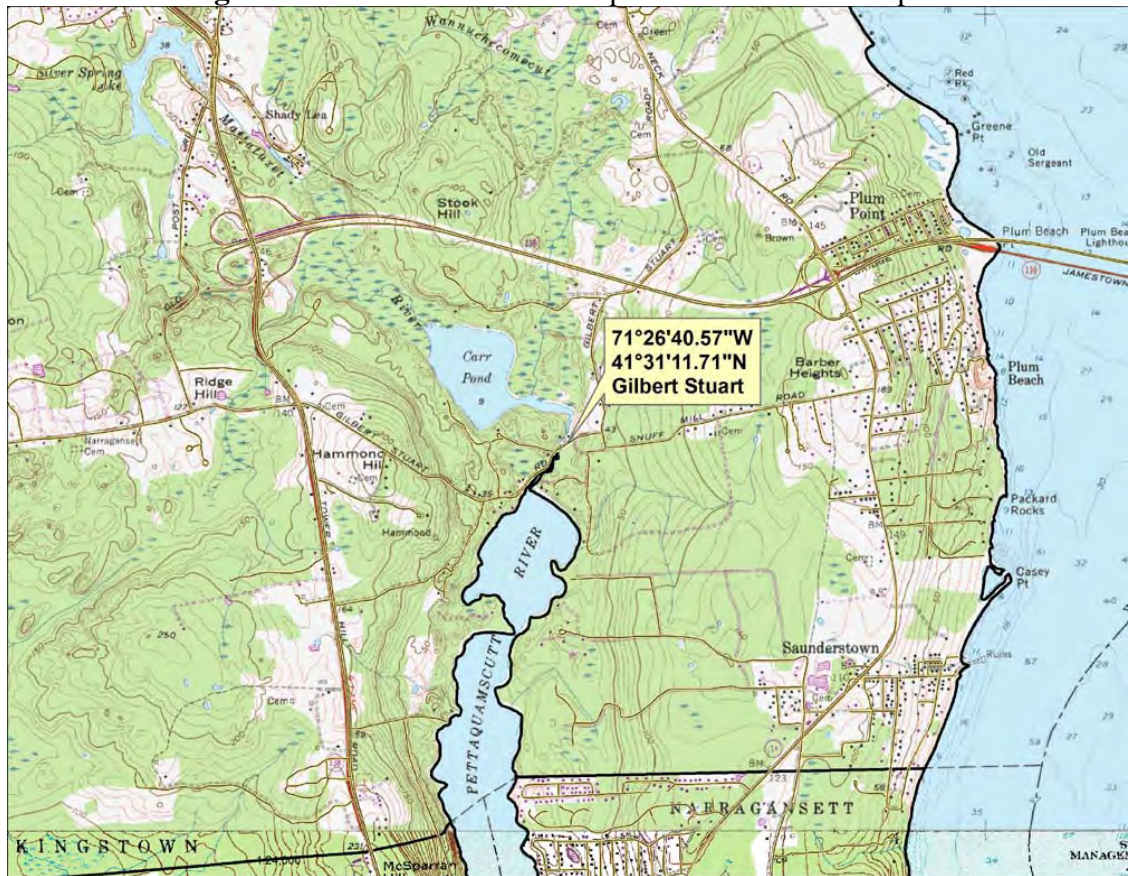


Figure 3. Total Frequency of American Eels collected 2000-2012 at Gilbert Stuart and Hamilton Fish Ladders. (Note – sampling at Hamilton began in 2004).

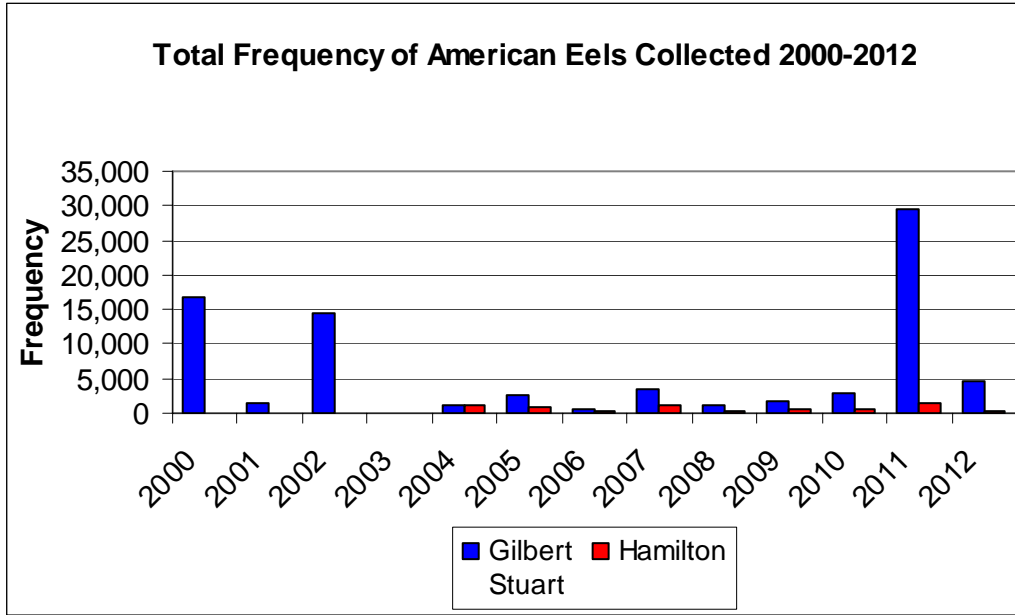


Figure 4. Total Frequency of American Eels collected in 2012 at Gilbert Stuart and Hamilton Fish Ladders.

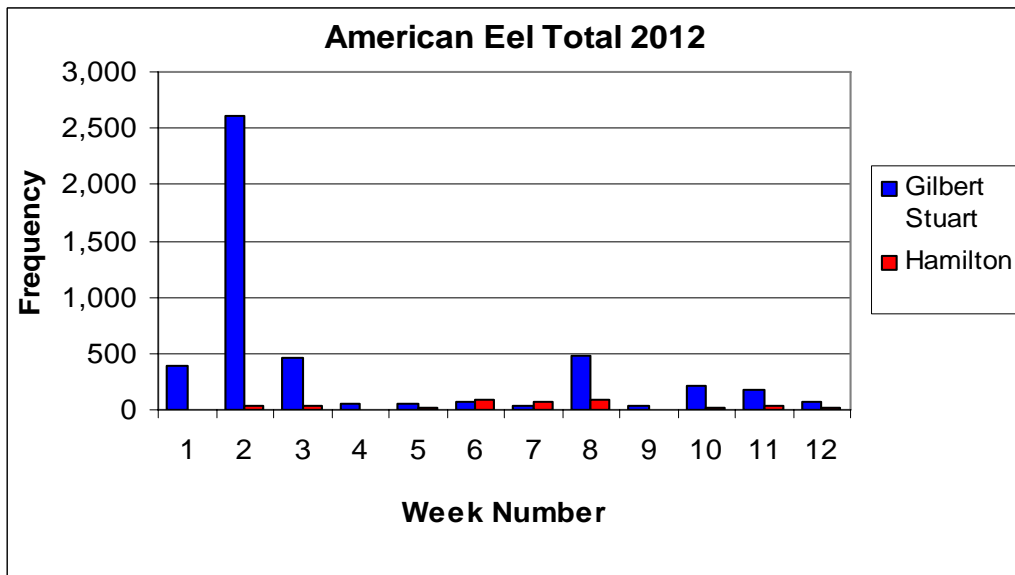


Figure 5a and 5b. Number of young-of-the-year and elvers at length (mm) observed at both stations in RI's 2012 survey. Size frequencies corresponding to the glass eel and elver life stages are distinguished, where young-of-the-year eel >65 mm are considered elvers.

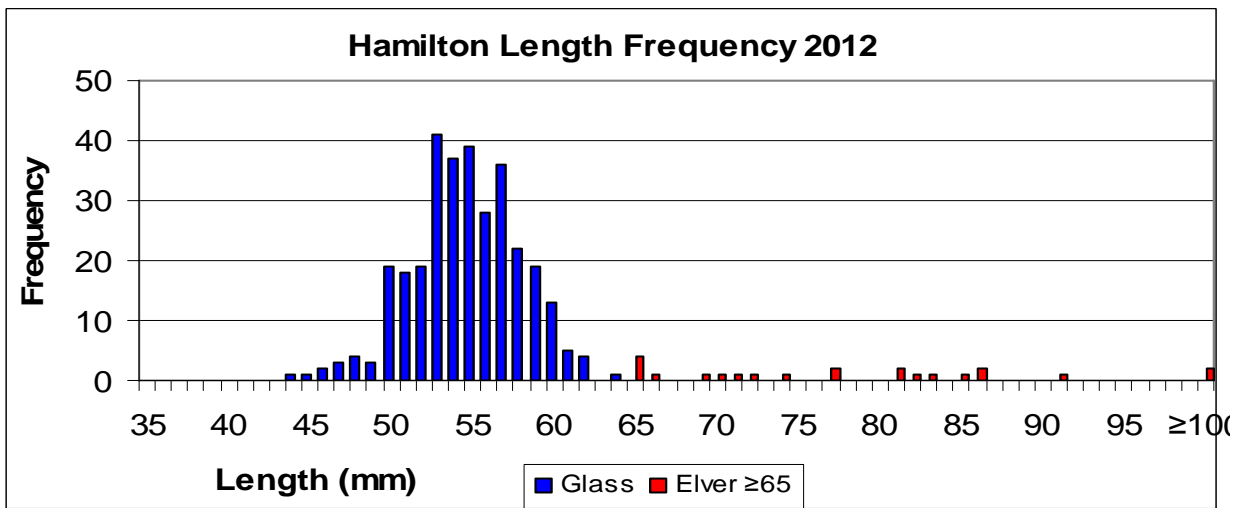
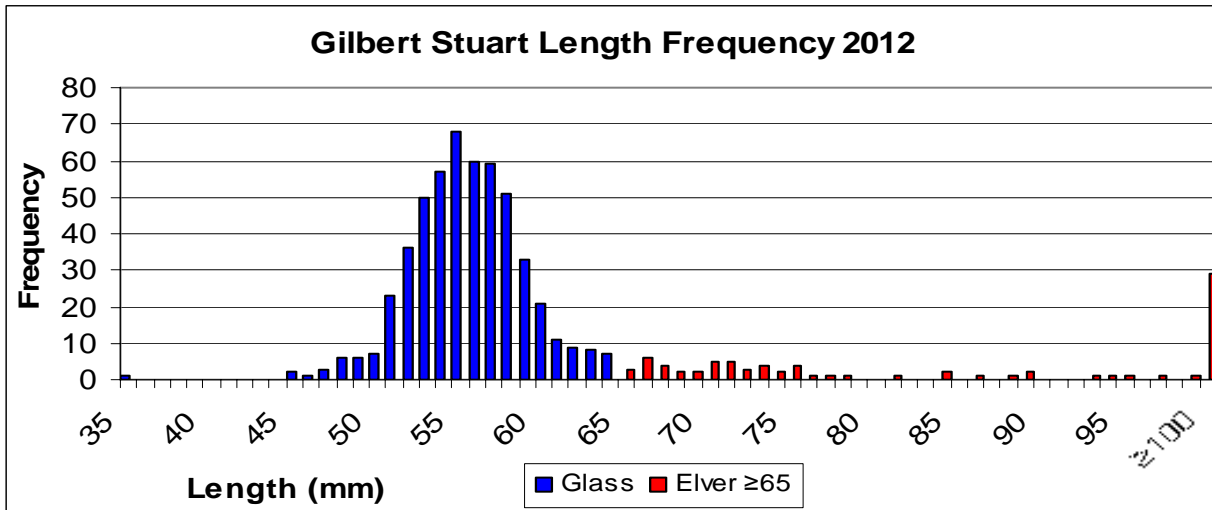


Figure 6a and 6b. Number of young-of-the-year and elvers by weight (grams) observed at both stations in RI's 2012 survey.

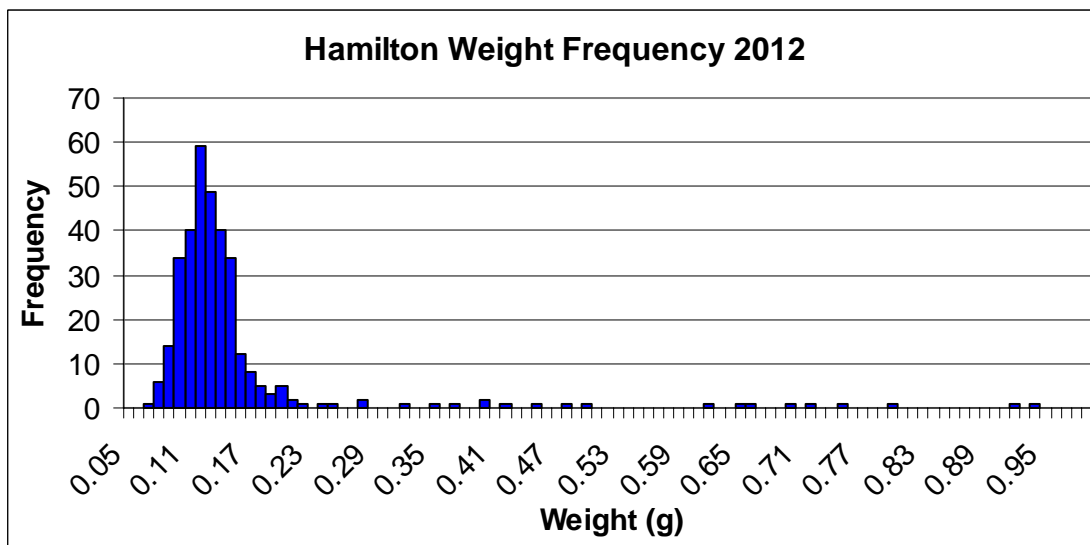
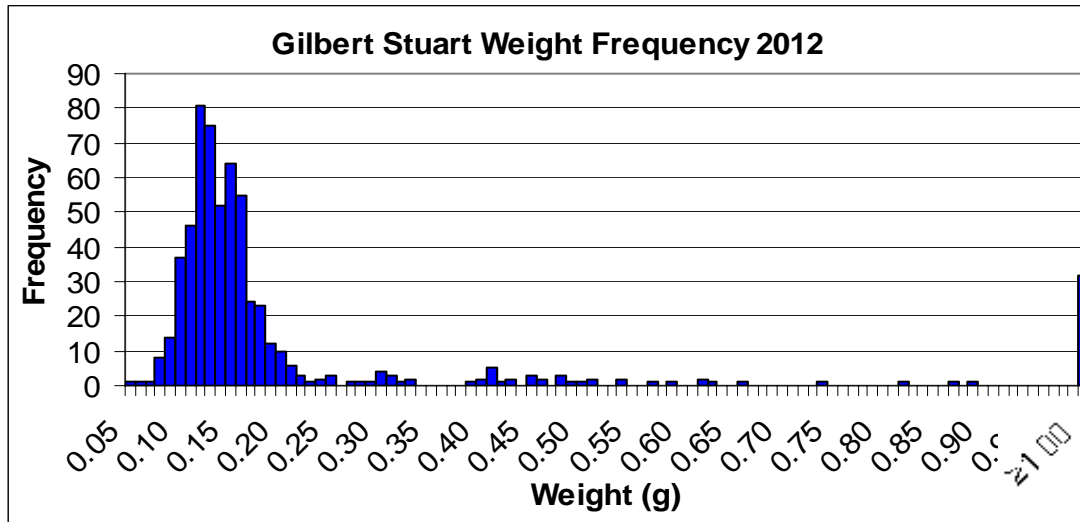


Figure 7. Eel frequency, soak time (hrs), water height (meters), and water temperature (°C) observed at Gilbert Stuart Dam during RI's 2012 sampling period. O Indicates a full moon phase.

Gilbert Stuart Fish Ladder - Physical Parameters

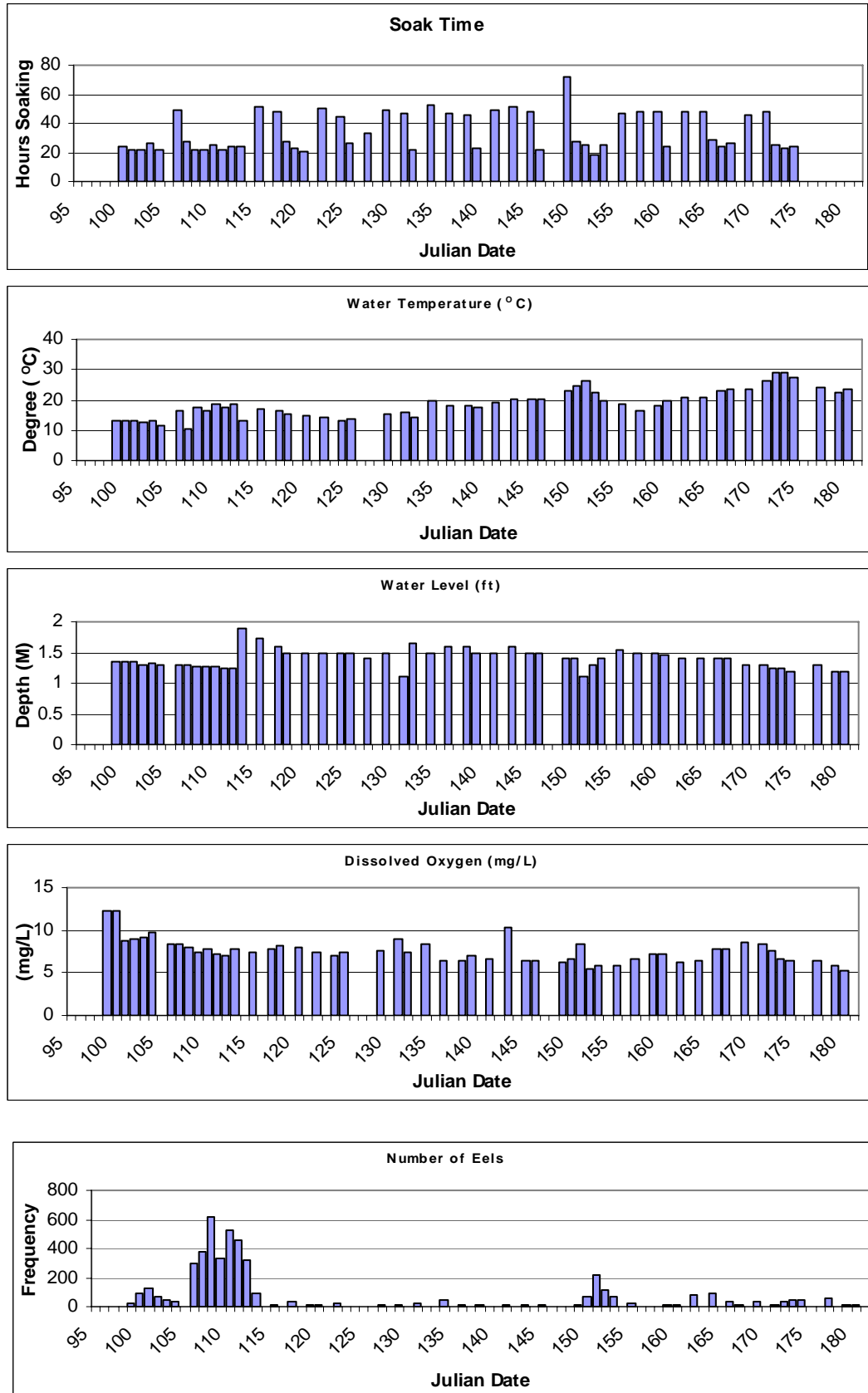


Figure 8. Eel numbers , soak time (hrs), water height (meters), and water temperature (°C) observed at Hamilton Fish Ladder during RI's 2012 sampling period. O Indicates a full moon phase.

Hamilton Fish Ladder - Physical Parameters

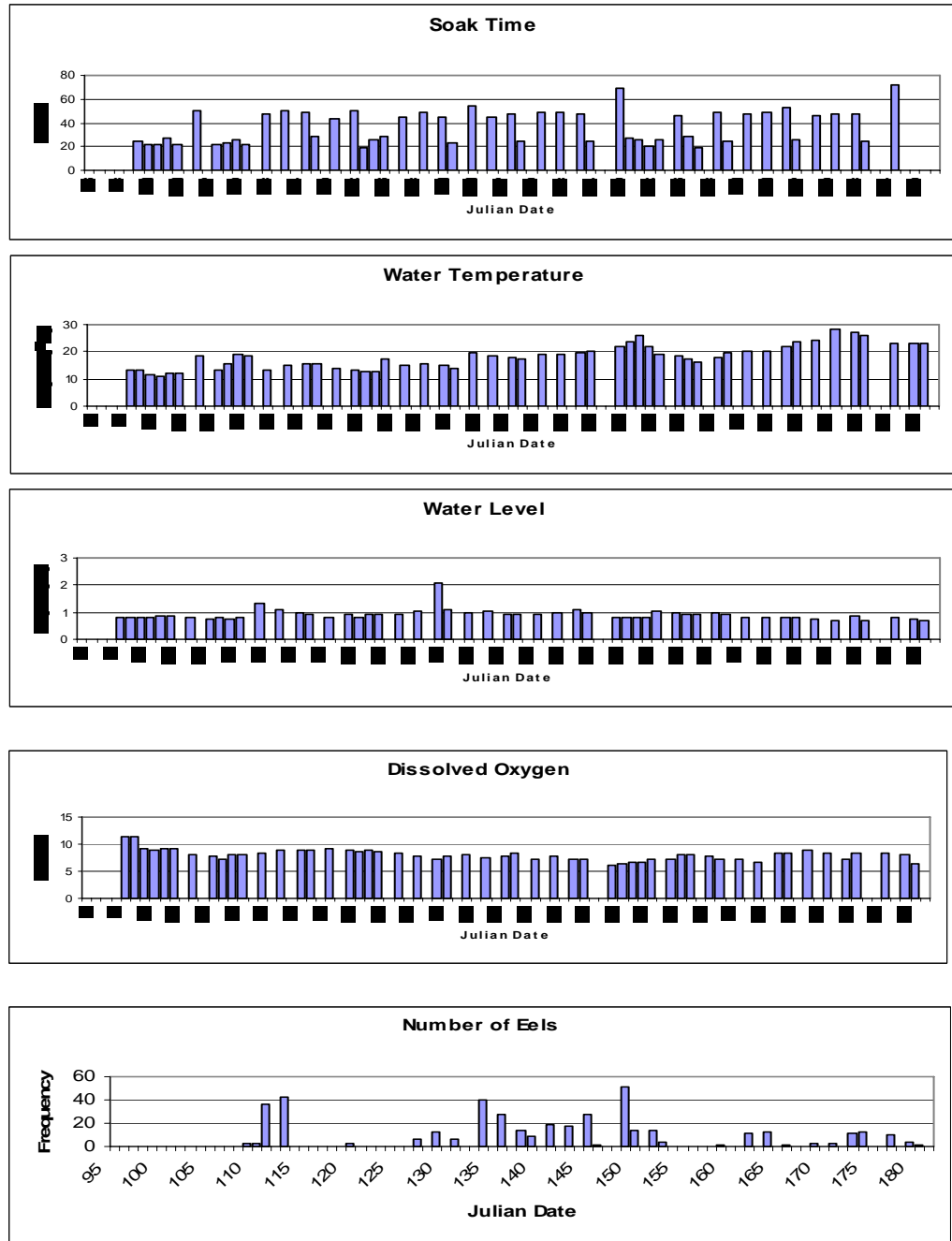


Figure 9a and 9b. Water temperature versus American eel frequency at Gilbert Stuart and Hamilton Fish Ladders in 2012.

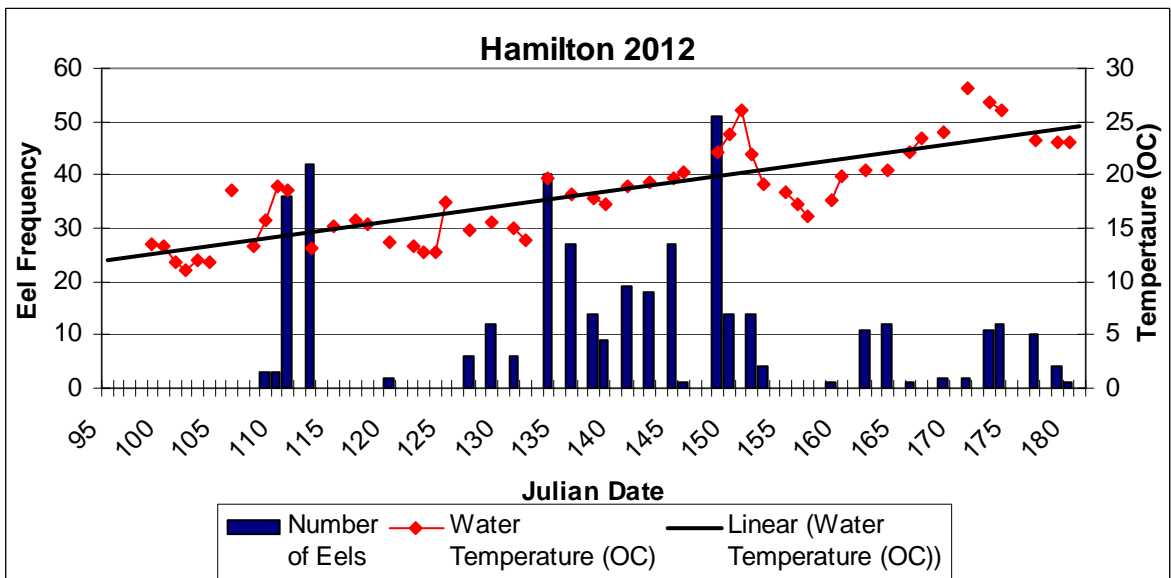
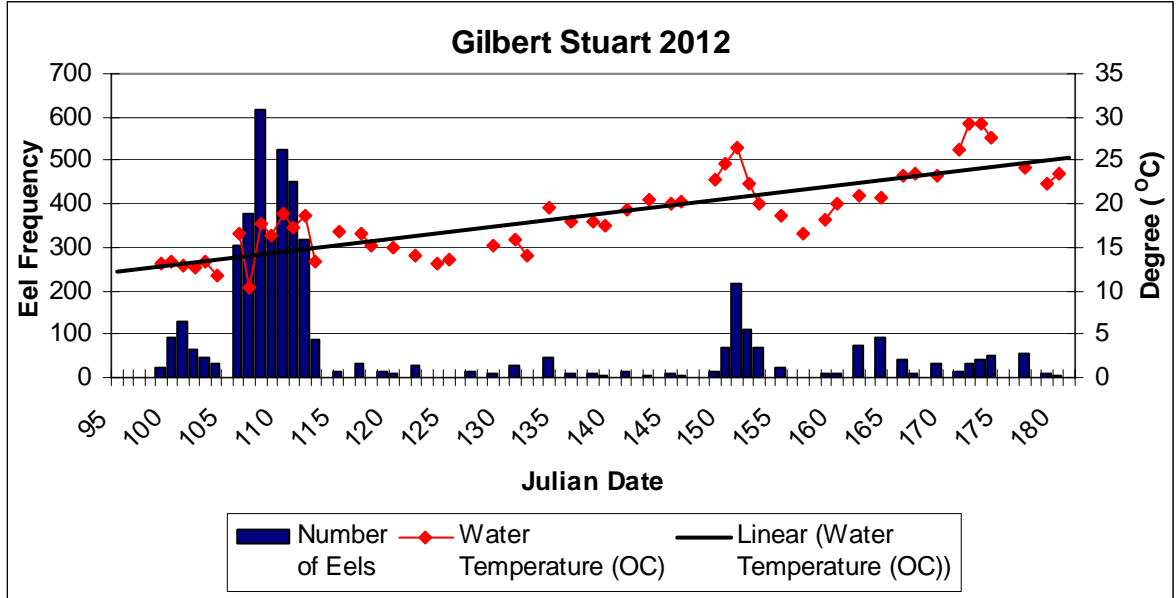
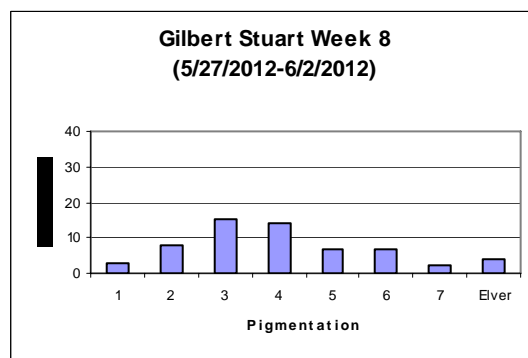
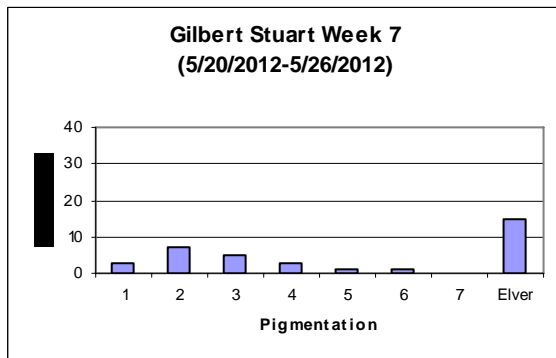
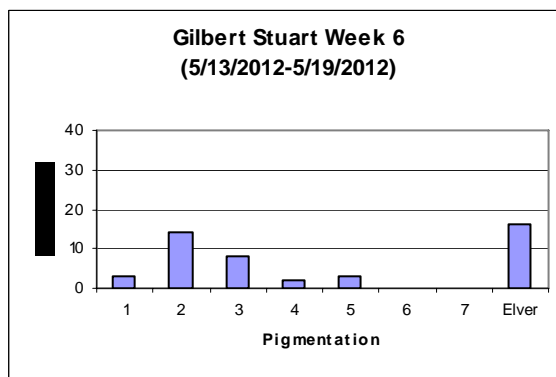
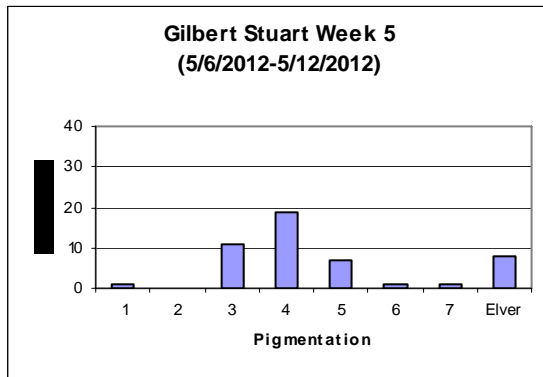
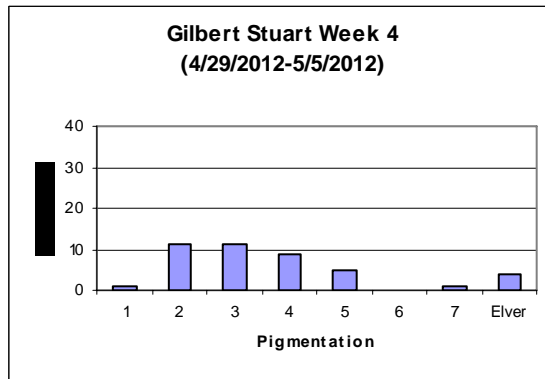
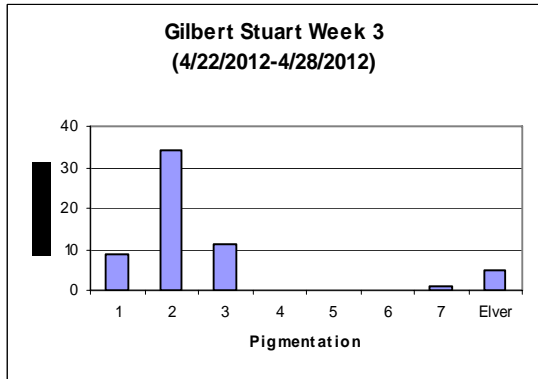
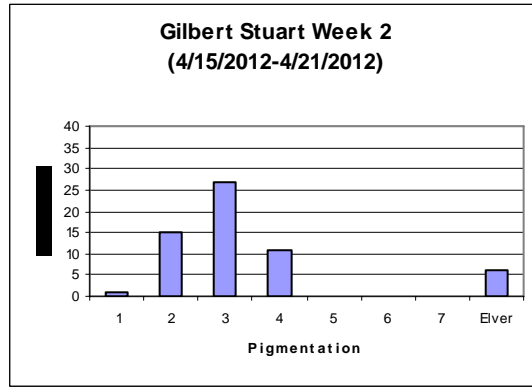
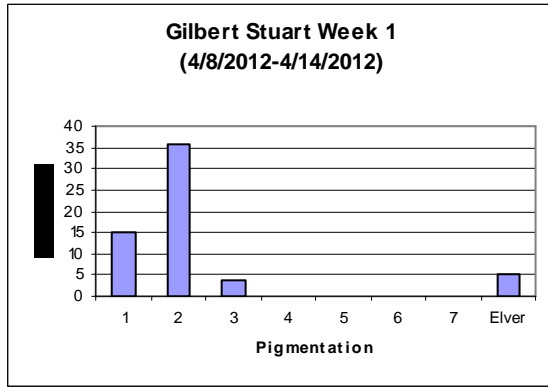


Figure 10a. Pigmentation stages of eels, weeks 1-12 at Gilbert Stuart – 2012.



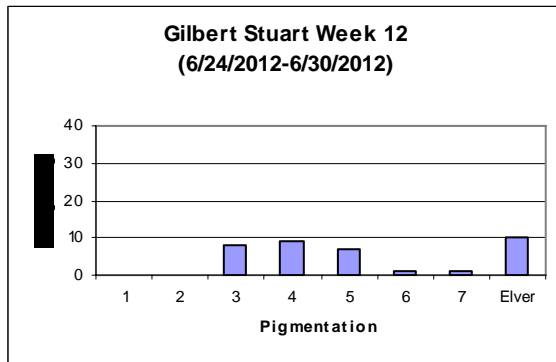
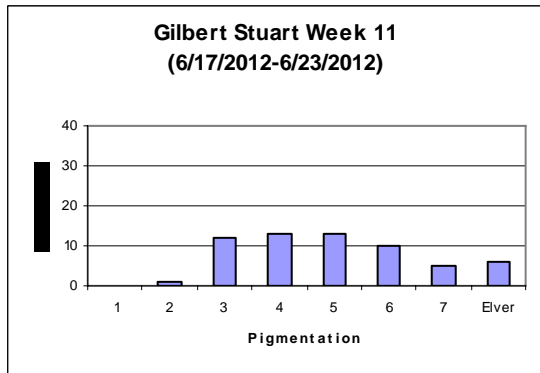
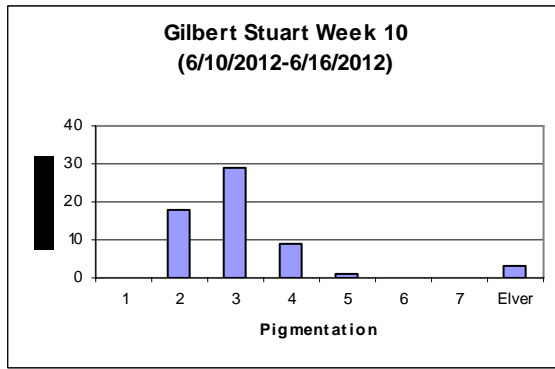
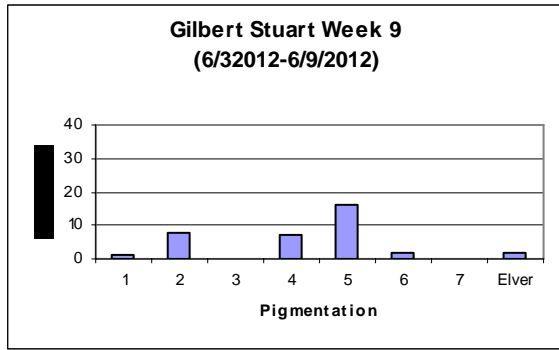
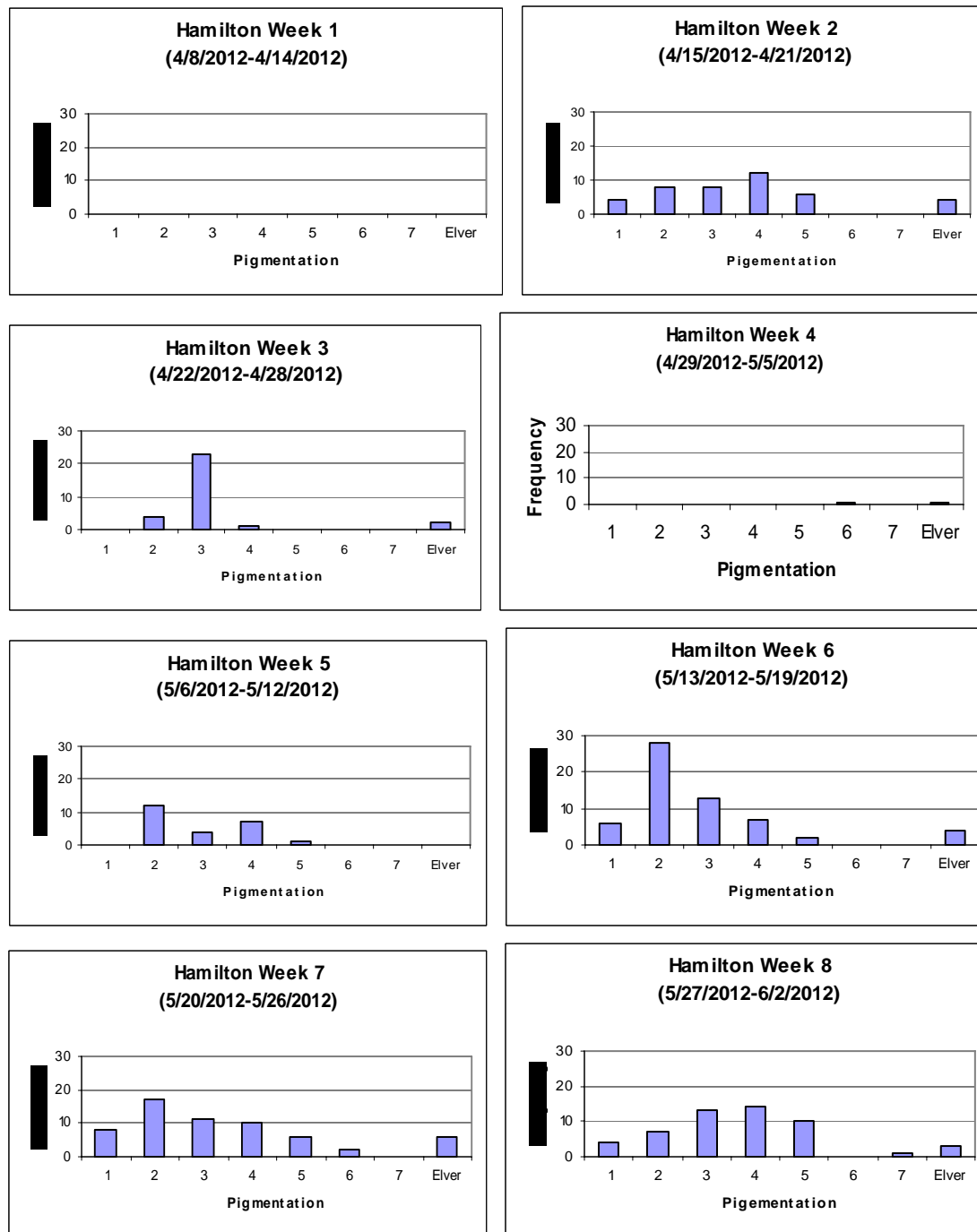
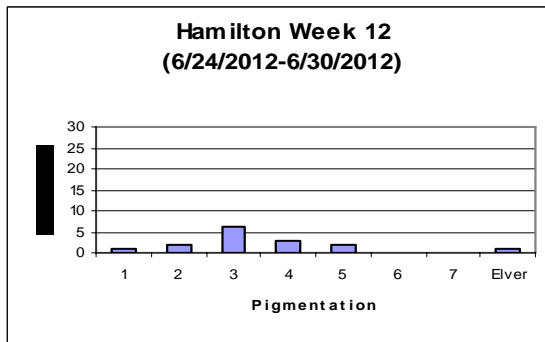
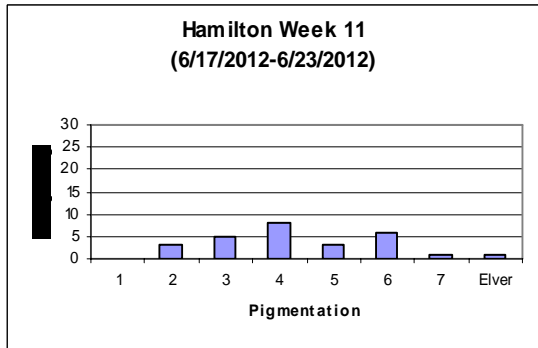
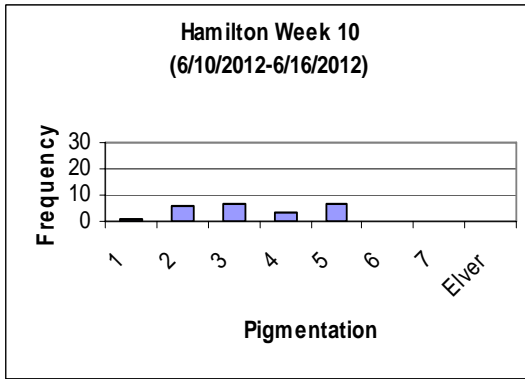
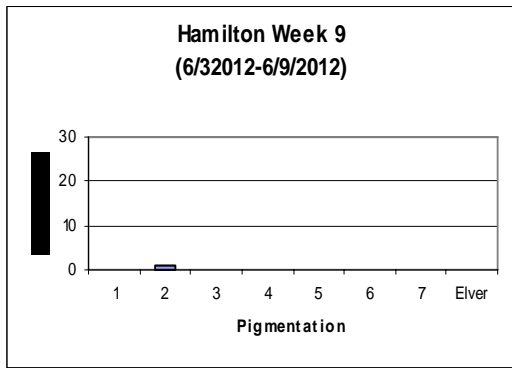


Figure 10b. Pigmentation stages of eels, weeks 1-12 at Hamilton – 2012.





APPENDIX.

A. Copy of the State of Rhode Island's current regulations for the management of American eel fisheries. The regulations for American Eel as they exist now are the same as they were in 2006.

Rhode Island
Department of Environmental Management
Division of Fish and Wildlife
FISHING REGULATIONS

Part I – Freshwater Fisheries Regulations

1.5 The minimum size limit for American Eel *Anguilla rostrata* shall be six (6) inches (measured from the tip of the snout to the end of the tail).

Rhode Island
Department of Environmental Management
Division of Fish and Wildlife
MARINE FISHERIES STATUTES AND REGULATIONS

Part VII - Minimum Sizes of Fish/Shellfish

7.6 Minimum sizes, other species -- Except as specifically noted, no person shall possess or take any of the following species which are less than the following minimum size
EEL: Commercial and Recreational - 6"

7.16 American Eel – No person shall take, attempt to take, possess, sell, or offer for sale any American Eel measuring less than six inches (6"). No person shall possess more than fifty (50) American Eel per day unless commercially licensed pursuant to RIGL 20-2-26, 20-2-27, 20-2-28, 20-2-28.1. RIMFC REGULATIONS [Penalty – Part 3.3 (RIGL 30-3-3)]

Appendix B and C. Raw data collected at Gilbert Stuart and Hamilton Fishways.

2012 - Gilbert Stuart

Date	Week #	Time	Water Level (ft)	Water Temp (°C)	Diss. Oxy (mg/L)	Gear	Moon Phase	Total Catch Wgt.	Total Catch Freq.
04/08/12	1						3		
04/09/12	1	-	1.36	13.1	12.22	1	4	3.21	25
04/10/12	1	24.33	1.34	13.4	12.36	1	5	18.97	92
04/11/12	1	21.75	1.34	13.0	8.83	1	6	23.72	130
04/12/12	1	22.00	1.30	12.6	9.02	1	7	10.59	63
04/13/12	1	26.25	1.32	13.4	9.10	1	8	11.31	44
04/14/12	1	22.00	1.30	11.7	9.70	1	9	6.29	33
04/15/12	2						10		
04/16/12	2	49.25	1.30	16.6	8.30	1	11	59.15	302
04/17/12	2	27.00	1.30	10.3	8.30	1	12	76.95	379
04/18/12	2	21.75	1.28	17.7	7.96	1	13	212.58	615
04/19/12	2	22.00	1.26	16.3	7.49	1	14	76.85	330
04/20/12	2	25.50	1.26	18.8	7.82	1	15	94.34	524
04/21/12	2	22.00	1.25	17.3	7.24	1	16	104.70	452
04/22/12	3	24.00	1.25	18.6	7.10	1	17	87.25	320
04/23/12	3	23.50	1.90	13.4	7.85	2	18	14.44	88
04/24/12	3						19		
04/25/12	3	51.00	1.72	16.8	7.46	2	20	7.07	13
04/26/12	3						21		
04/27/12	3	48.00	1.60	16.6	7.73	1	22	8.71	32
04/28/12	3	27.50	1.50	15.3	8.15	1	23	0.12	1
04/29/12	4	23.00				1	24	1.44	12
04/30/12	4	21.00	1.50	15.0	7.89	1	25	3.3	10
05/01/12	4						26		
05/02/12	4	50.83	1.50	14.1	7.50		27	6.16	28
05/03/12	4						28		
05/04/12	4	44.50	1.50	13.1	7.02	1	29	0.25	2
05/05/12	4	26.17	1.50	13.7	7.35	1	1	0.49	2
05/06/12	5						2		
05/07/12	5	44.75	1.40			1	3	4.10	14
05/08/12	5						4		
05/09/12	5	49.25	1.50	15.2	7.68	1	5	1.27	8
05/10/12	5						6		
05/11/12	5	47.25	1.10	15.9	9.02	1	7	4.36	26
05/12/12	5	21.15	1.65	14.1	7.41	1	8		0
05/13/12	6						9		
05/14/12	6	53.00	1.50	19.6	8.32	1	10	9.21	47
05/15/12	6						11		
05/16/12	6	46.83	1.60	17.9	6.34	1	12	5.51	10
05/17/12	6						13		

Date	Week #	Time	Water Level (ft)	Water Temp (°C)	Diss. Oxy (mg/L)	Gear	Moon Phase	Total Catch Wgt.	Total Catch Freq.
05/18/12	6	45.83	1.60	18.0	6.49		14	21.38	11
05/19/12	6	23.00	1.50	17.4	7.00		15	14.2	5
05/20/12	7						16		
05/21/12	7	49.00	1.48	19.3	6.58	1	17	24.16	14
05/22/12	7						18		
05/23/12	7	51.00	1.60	20.4	10.40	1	19	0.71	6
05/24/12	7						20		
05/25/12	7	47.67	1.50	20.1	6.40	1	21	13.65	10
05/26/12	7	21.67	1.50	20.2	6.50	1	22	3.76	5
05/27/12	8						23		
05/28/12	8						24		
05/29/12	8	71.50	1.40	22.8	6.22	1	25	3.30	15
05/30/12	8	28.00	1.40	24.7	6.69	1	26	11.77	68
05/31/12	8	25.25	1.10	26.5	8.44	1	27	48.17	215
06/01/12	8	18.75	1.30	22.3	5.50	1	28	20.09	111
06/02/12	8	25.67	1.40	20.0	5.90		29	12.62	68
06/03/12	9						1		
06/04/12	9	46.33	1.55	18.7	5.92	1	2	4.38	25
06/05/12	9						3		
06/06/12	9	48.00	1.50	16.6	6.70	1	4		0
06/07/12	9						5		
06/08/12	9	48.00	1.50	18.2	7.13	1	6	1.14	8
06/09/12	9	24.00	1.45	20.0	7.28	1	7	1.22	8
06/10/12	10						8		
06/11/12	10	48.25	1.40	20.9	6.31	1	9	12.34	75
06/12/12	10						10		
06/13/12	10	47.75	1.40	20.7	6.48		11	19.36	91
06/14/12	10	28.50					12		
06/15/12	10	24.00	1.40	23.2	7.73	1	13	7.26	40
06/16/12	10	26.00	1.40	23.4	7.80	1	14	5.56	7
06/17/12	11						15		
06/18/12	11	46.00	1.30	23.3	8.55	1	16	5.55	33
06/19/12	11						17		
06/20/12	11	47.75	1.30	26.2	8.47		18	3.09	15
06/21/12	11	25.00	1.25	29.2	7.61	1	19	8.04	33
06/22/12	11	22.50	1.25	29.3	6.55	1	20	10.57	41
06/23/12	11	24.00	1.20	27.6	6.50	1	21	13.51	49
06/24/12	12						22		
06/25/12	12						23		
06/26/12	12		1.30	24.2	6.37	1	24	12.31	55
06/27/12	12						25		

Date	Week #	Time	Water Level (ft)	Water Temp (°C)	Diss. Oxy (mg/L)	Gear	Moon Phase	Total Catch Wgt.	Total Catch Freq.
06/28/12	12		1.20	22.4	5.86	1	26	2.29	10
06/29/12	12		1.20	23.5	5.33	1	27	0.96	6
06/30/12	12						28		

2012 - Annaquatucket

04/08/12	1						3		
04/09/12	1	-	0.80	13.5	11.50	1	4	0	0
04/10/12	1	24.25	0.80	13.4	11.36	1	5	0	0
04/11/12	1	22.25	0.82	11.8	9.06	1	6	0	0
04/12/12	1	21.17	0.80	11.1	9.01	1	7	0	0
04/13/12	1	26.83	0.84	12.0	9.22	1	8	0	0
04/14/12	1	22.00	0.84	11.9	9.18	1	9	0	0
04/15/12	2						10		
04/16/12	2	50.25	0.80	18.6	7.99	1	11	0	0
04/17/12	2						12		
04/18/12	2	46.00	0.75	13.3	7.73	1	13	0	0
04/19/12	2	23.33	0.78	15.8	7.18	1	14	0.41	3
04/20/12	2	26.42	0.74	19.0	8.17	1	15	0.73	3
04/21/12	2	22.00	0.78	18.5	8.10	1	16	6.84	36
04/22/12	3						17		
04/23/12	3	47.00	1.30	13.1	8.44	2	18	7.38	42
04/24/12	3						19		
04/25/12	3	49.67	1.10	15.2	8.82	2	20	0	0
04/26/12	3						21		
04/27/12	3	48.75	1.00	15.8	8.76	2	22	0	0
04/28/12	3	28.25	0.90	15.4	8.80	1	23	0	0
04/29/12	4						24		
04/30/12	4	43.67	0.82	13.6	9.03	1	25	0.50	2
05/01/12	4						26		
05/02/12	4	49.67	0.95	13.4	8.93	1	27	0	0
05/03/12	4	18.83	0.80	12.8	8.50	1	28	0	0
05/04/12	4	25.17	0.92	12.8	8.81	1	29	0	0
05/05/12	4	28.00	0.95	17.5	8.57	1	1	0	0
05/06/12	5						2		
05/07/12	5	45.00	0.90	14.8	8.42	1	3	0.74	6
05/08/12	5						4		
05/09/12	5	48.50	1.05	15.5	7.90	1	5	1.64	12
05/10/12	5						6		
05/11/12	5	45.17	2.10	15.0	7.27	1	7	0.81	6
05/12/12	5	22.83	1.10	13.8	7.80	1	8	0	0

Date	Week #	Time	Water Level (ft)	Water Temp (°C)	Diss. Oxy (mg/L)	Gear	Moon Phase	Total Catch Wgt.	Total Catch Freq.
05/13/12	6						9		
05/14/12	6	54.33	0.98	19.7	8.00	1	10	6.34	40
05/15/12	6						11		
05/16/12	6	44.83	1.05	18.2	7.50	1	12	4.14	27
05/17/12	6						13		
05/18/12	6	47.08	0.90	17.9	7.91	1	14	2.35	14
05/19/12	6	23.75	0.90	17.3	8.22	1	15	1.68	9
05/20/12	7						16		
05/21/12	7	48.33	0.90	18.9	7.33	1	17	4.07	19
05/22/12	7						18		
05/23/12	7	49.42	0.98	19.3	7.74	1	19	3.33	18
05/24/12	7						20		
05/25/12	7	47.25	1.10	19.7	7.14	1	21	5.72	27
05/26/12	7	24.00	1.00	20.3	7.23	3	22	0.14	1
05/27/12	8						23		
05/28/12	8						24		
05/29/12	8	70.75	0.80	22.2	6.10	1	25	10.84	51
05/30/12	8	27.00	0.80	23.9	6.51	1	26	1.70	14
05/31/12	8	25.58	0.80	26.0	6.80	1	27	0	0
06/01/12	8	19.67	0.80	22.0	6.61	1	28	1.91	14
06/02/12	8	25.50	1.02	19.1	7.32	1	29	0.55	4
06/03/12	9						1		
06/04/12	9	46.67	1.00	18.3	7.12	1	2	0	0
06/05/12	9	27.83	0.94	17.3	8.19	1	3	0	0
06/06/12	9	19.50	0.90	16.1	8.12	1	4	0	0
06/07/12	9						5		
06/08/12	9	48.50	1.00	17.6	7.81	1	6	0.13	1
06/09/12	9	24.50	0.95	19.8	7.23	1	7	0	0
06/10/12	10						8		
06/11/12	10	47.25	0.80	20.4	7.35	1	9	1.38	11
06/12/12	10						10		
06/13/12	10	48.25	0.80	20.4	6.68	1	11	1.76	12
06/14/12	10						12		
06/15/12	10	52.75	0.80	22.2	8.35	1	13	0.12	1
06/16/12	10	25.75	0.80	23.5	8.40	1	14	0	0
06/17/12	11						15		
06/18/12	11	46.75	0.75	24.0	8.83	1	16	0.27	2
06/19/12	11						17		
06/20/12	11	46.92	0.70	28.1	8.43	1	18	0.31	2
06/21/12	11						19		
06/22/12	11	47.58	0.85	26.9	7.17	1	20	1.47	11

Date	Week #	Time	Water Level (ft)	Water Temp (°C)	Diss. Oxy (mg/L)	Gear	Moon Phase	Total Catch Wgt.	Total Catch Freq.
06/23/12	11	24.00	0.70	26.0	8.30	1	21	2.32	12
06/24/12	12						22		
06/25/12	12						23		
06/26/12	12	71.75	0.80	23.2	8.44	1	24	2.14	10
06/27/12	12						25		
06/28/12	12		0.75	23.0	8.09	1	26	0.54	4
06/29/12	12		0.70	23.0	6.39	1	27	0.17	1
06/30/12	12						28		

State of Connecticut
Compliance Report for American Eel
September 1, 2013

I. Introduction

A. Purpose

The Atlantic States Marine Fisheries Commission adopted a Fishery Management Plan for American eel, *Anguilla rostrata* in November of 1999. The Plan requires an annual report from each state to document compliance with the requirements of the Plan.

B. Background Information

The American eel is a diadromous fish found from the Caribbean Sea north to Newfoundland (Scott and Crossman 1973). It has four life stages. A **glass eel** is a non-pigmented young-of-year (YOY) stage that comes from saltwater to freshwater. An **elver** is a pigmented YOY stage that ascends freshwater streams. A **yellow eel** is a freshwater resident, and the **silver eel** is a sexually mature adult phase that migrates back to the ocean.

Most waters in the state of Connecticut historically hosted populations of American eel. Early dams (1730 – 1860) that were responsible for decimating native anadromous fish runs did not completely block the migratory path of eel and the species remained widely distributed in the state. Even now, the species is one of the most common fish found in inland waters although their abundance reflects the number and height of dams along their migratory route. Most notably, high hydroelectric dams (>80 ft) have reduced the upstream occurrence of eels in the Housatonic River watershed to extremely low numbers.

There has been a traditional eel pot fishery for yellow eel in Connecticut since colonial times. Currently, that fishery is only permitted in tidewater areas and the most important area is the Connecticut River between Hartford and Long Island Sound. State regulations allowed a glass eel fishery but this fishery was minimal until the early 1990s when market pressures increased demand. The Connecticut Department of Environmental Protection (name changed in 2011 to The Connecticut Department of Energy and Environmental Protection) (DEEP) promulgated conservation regulations that allowed the fishery to continue, but under strict controls. The glass eel fishery was closed by statute in 2002 (Public Act No. 02-50).

The ability to assess the status of the eel stock in Connecticut is limited by several factors. No historical information (pre-1987) on the population density of yellow eels in Connecticut waters exists. Distribution and abundance data are limited to that collected in a statewide stream survey (Hagstrom et al. 1989). The scientific literature does not provide useful guidance to how many eels these streams are capable of supporting. Furthermore, there is no context for the role that the Connecticut American eel stock fills in the larger panmixic North American stock.

C. Summary of the year highlighting any significant changes in monitoring, regulations or harvest.

No changes.

II. Request for *de minimus*, where applicable.

Not applicable.

III. Previous calendar year's fishery and management programs. (2012, except as noted.)

A. Fishery dependent monitoring.

Commercial fishermen are required to record daily fishing activity in logbooks. Commercial fishermen logs are submitted to the department monthly and include information on both effort and landings by species.

Recreational catch and harvest are monitored through the Marine Recreational Fisheries Statistics Survey (MRFSS). DEEP staff conducted the fishermen interview portion (intercept) of MRFSS, while the telephone survey portion is conducted by the National Marine Fisheries Service contractor.

B. Activity and results of fishery independent monitoring.

1. Young-of-Year Abundance Survey

METHODS:

The Fishing Brook Eel Pass is located at the base of the Ingham Hill Dam in Old Saybrook. This site is located 3.6 river-kilometers from Long Island Sound, in fresh water, less than 25 meters upstream of the high tide mark. The eel pass was operated continuously for 108 days from March 4 to July 6, 2012 to monitor YOY. The trap was checked each weekday during the YOY eel run and any captured eels were netted, enumerated, and released into the headpond. Once the YOY eel run ended, the eel pass was periodically checked for the remainder of the season. Water temperature and river discharge (calculated from a stream gage and fishway flow) was recorded during each check and total effort was calculated for each day's catch.

Weekly samples of YOY eels were collected and taken into the lab for analysis. Freshly sacrificed YOY eels were measured for total length and weight, and were qualitatively assessed for pigmentation and assigned to one of seven standardized 'pigment stage' classes, as described in Haro and Krueger (1998).

RESULTS:

Young-of year eels were captured on 72 of the 75 checks from March 6 to July 6 for a total of 30,253 fish (Appendix A - Table 1). This was the earliest date that YOY have been captured at this site. The YOY eel run peaked on April 9 (10,000 YOY eels captured; Appendix A- Figure 1). YOY eels were captured at water temperatures between 6 and 23 degrees C (Appendix A- Figure 2), and at river discharge between 1.08 and 37.72 cfs (Appendix A- Table 1, Figure 3).

A total of 876 YOY eels was sub-sampled from March 12 to July 6 (Appendix A- Table 2) representing

3% of the total number of YOY eels captured. Fish averaged 57.1 mm (range = 48.7 – 67.5) in total length (Appendix A- Figure 4) and 0.13 grams (range = 0.04 – 0.25) in weight (Appendix A- Figure 5). Of all fish sampled, 8% were assigned to pigment class 1; 20% were assigned to pigment class 2; 16% were assigned to pigment class 3; 11% were assigned to pigment class 4; 11% were assigned to pigment class 5; 15% were assigned to pigment class 6; and 20% were assigned to pigment class 7 (Appendix A- Table 3 and Figure 6).

Catch-Per-Unit-Effort at the Fishing Brook Eel Pass in 2012 was 10.272 (Appendix A – Table 1), which was lower last year's value of 11.519.

2. Other Monitoring Projects

a. *Fishing Brook Eel Pass (Fishing Brook)*

In addition to being used as a YOY index site, the Fishing Brook Eel Pass was operated by the DEEP to pass larger eels during and after the end of the YOY run. For clarity, the results are separated from the YOY Abundance Survey. A total of 715 eels (653 elver; 62 yellow) was captured and passed during the 2012 season.

b. *Greeneville Dam Eel Lift (Shetucket River)*

This eel pass is a replacement for the Greeneville Dam Eel Pass which was destroyed by a high flow event that occurred on March 30, 2010. At the time of construction, it was unique in its design in that all of the physical components of the eel pass (spray bar, attraction water, two ramps, and trap) comprise a single, lift-able unit. This design will allow staff to adjust the height of the unit with changes in tail water elevation as well as raise it above river flood stage. The eel lift was installed and began operating on April 20 and closed on August 1 (due to dam repairs). A total of 1,571 eels was enumerated and released upstream of the dam (Appendix B – Table 1) during the 2012 season.

c. *Occum Dam Eel Pass (Shetucket River)*

This eel pass is operated by the dam owner, the City of Norwich. The eel pass was opened on April 11 and closed on September 28. A total of 4,578 eels was enumerated and released upstream of the dam during the 2012 season (2011= 2,036).

In 2007, in agreement with the DEEP, the City of Norwich added two auxiliary 'Delaware' style eel passes on the dam's spillway. It is unknown how many eels utilized these two new eel passes, and if or to what degree they may have influenced the numbers of eels captured and passed at the main eel pass. The design of the main eel pass allows for the trapping of eel in a collection tank during its evaluation phase, after which it will operate as a self release eel pass with no trap.

d. *Kinneytown Dam Eel Pass (Naugatuck River)*

This eel pass is owned and operated by the DEEP in cooperation with the hydroelectric project owner (Enel North America). The eel pass was removed for renovations and did not operate during the 2012 season.

e. *Mill River Eel Pass (Mill River)*

This eel pass was constructed at the first dam on the Mill River by the Regional Water Authority in 2004. This eel pass was renovated in 2011 and opened on May 8, 2012 (collection tank checks

began on May 15) and was closed on October 26. A total of 1,765 eels (1,661 elver; 104 yellow) was enumerated and released upstream of the dam (Appendix B – Table 2) during the 2012 season. In 2011, a total of 1,650 eels was passed.

f. *Lower Millpond Dam Eel Pass (Mill Brook)*

This eel pass is owned and operated by the DEEP in cooperation with the Old Lyme Land Trust. The eel pass was not operated during the 2012 eel passage season due to a malfunctioning water-supply-system. However, a non-profit educational group that owns a house near the dam passed over 35,000 glass eels using eel traps and buckets.

g. *Tunnel Dam Eel Pass (Quinebaug River)*

This eel pass is owned and operated by FirstLight Power Resources (FLPR) and operated for its fourth year in 2012. A total of 1,248 eels was enumerated and released upstream of the dam during the 2012 season. In 2011, a total of 30,453 eels was passed.

h. *Rainbow Dam Fishway Interim Eel Pass (Farmington River)*

A portable eel-avator was fished inside the Rainbow Fishway (Farmington River) in Windsor, CT in 2011 after the fishway had been dewatered for the summer. The eel-avator was opened on July 19 (collection tank checks began on July 21) and closed on August 31. A total of 197 eels (195 elver; 2 yellow) was enumerated and released upstream of the dam (Appendix B- Table 3) during the 2012 season. In 2011, a total of 5,512 eels was passed.

i. *Rainbow Dam Fishway Silver Eel Window Counts (Farmington River)*

The viewing window in the Rainbow Fishway on the Farmington River (a Connecticut River tributary) is equipped with a digital imaging system. This equipment is used to count down-running silver eels during the fall. The fishway operated from October 2 to November 5 in which time a total of 117 silver eel was observed migrating downstream past the viewing window. Silver eel migration began on October 3 (one eel; water temperature = 17 degrees Celsius), peaked on October 15 (19 eel; water temperature = 14 degrees Celsius), and ended on October 22 (one eel; water temperature = 14 degrees Celsius)

j. *Bunnells Pond Dam Eel Pass (Pequonnock River)*

An experimental eel pass better suited to the site was installed for the 2012 season. A total of 147 eels was enumerated and released upstream of the dam in 2012. This was not operated in the 2011 season.

k. *Haakonsen Fishway Silver Eel Window Counts (Quinnipiac River)*

The viewing window in the Haakonsen Fishway on the Quinnipiac River is equipped with a digital imaging system. This equipment is used to count down-running silver eels during the fall. The fishway and the digital imaging system began fall operation on October 17, but the imaging system was removed on October 25 due to the threat of damage from Tropical Storm Sandy. The fishway remained open without the digital imaging system until December 7. A total four silver eels was observed migrating downstream past the viewing window (all on October 19) during the brief time that the imaging equipment was in place. This was the first season for this new fishway.

3. Management Projects

a. *Eel Pass, Aspinoak Dam (Quinebaug River)*

This eel pass is owned and operated by Summit Hydropower and was constructed in 2009. Eels had been able to surmount the old pitted surface of the dam's spillway, but in 2009 the spillway was resurfaced with a smooth layer of concrete thereby making it difficult for eels to ascend. Project staff worked with Summit Hydropower to install two "Delaware-style" eel passes through the wooden flashboards down the face of the spillway and into the bypass reach. The eel passes were positioned in the most suitable locations to pass eels. Eels have been observed passing through the eel pass into the headpond, though no eel enumeration was conducted in 2012.

b. *Eel Pass, Leesville Dam (Salmon River)*

This "Delaware-style" eel pass operated for the entire 2012 season. Eels have been observed passing through the eel pass into the headpond, although no eel enumeration was conducted in 2012.

c. *Eel Pass, Lees Pond Dam (Saugatuck River)*

This "Delaware-style" eel pass operated only a portion of the 2012 season. The wooden stop-logs through which the eel pass enters the headpond were replaced by seasonal staff but were not modified to accommodate the eel pass. Modifications will be performed during the 2013 season to restore function to the eel pass.

d. *Eel Pass, Mianus Pond Dam (Mianus River)*

This "Delaware-style" eel pass is owned and operated by the Town of Greenwich and was constructed in 2003 and operated the entire 2012 season. Eels have been observed passing through the eel pass into the headpond, though no eel enumeration was conducted in 2012.

e. *Eel Pass, Clarks Pond Dam Fishway (Indian River)*

Eels are able to ascend this pool and weir fishway but have difficulty exiting through the high velocity exit notch. In 2001 fish netting was added at the exit notch to provide eels a more suitable means of egress. This eel pass operated the entire year and no in-season monitoring was conducted.

f. *Eel Pass, Hanover Pond Dam Fishway (Quinnipiac River)*

Following its inaugural spring fish passage season in 2006, large numbers of eels were observed stranded immediately downstream of the exit pool stop logs of this Denil style fishway. Since then, each summer when the Denil is closed, a "Delaware-style" eel pass that passes through the stop logs and into the headpond has been installed. Eels have been observed passing through the eel pass into the headpond. No eel enumeration was conducted in 2012.

g. *Eel Pass, Babcock Pond Dam (Pine Brook)*

A "Delaware-style" eel pass was installed as part of the dam repair project at this State-owned dam in 2008. This eel pass operated the entire year and no in-season monitoring was conducted in 2012.

h. *Eel Pass, Jordan Millpond Dam (Jordan Brook)*

A "Delaware-style" eel pass was installed at the spillway of this privately-owned dam in 2008 and operated by the DEEP during the entire year. No in-season monitoring was conducted in 2012.

i. *Eel Pass, Lake Forest Dam (Island Brook)*

An eel pass utilizing natural materials was incorporated into the design and repairs to the dam’s spillway. Rocks of varying size and spacing were set into a channel of fresh concrete to provide passage for a broad size-range of eels (YOY – yellow). The exit of the eel pass channel is set ¼” lower than the dam’s crest to ensure adequate water flow through the entire eel passage season. The eel pass was completed in 2010. No in-season monitoring was conducted in 2012.

j. *Eel Pass, Haakonsen Fishway(Quinnipiac River)*

This eel pass, installed in 2012, utilizes the sloped spillway of this low-head dam. A two foot wide section of climbing substrate (Enkamat) is anchored directly to the spillway and passes into the headpond through a slotted weir board (the weir board also controls the amount of water that flows over the climbing substrate). No in-season monitoring was conducted in 2012.

C. Copy of regulations that were in effect

Within Connecticut General Statutes (CGS) sections 26-142a and 26-159a cover all regulations pertaining to American eel, as summarized earlier in this report. Copies of relevant sections are provided in Appendix C.

Statute (CGS 16-128a) prohibits the taking or attempted taking of glass eels, elver eels, and silver eels from the waters of Connecticut. This law took effect on October 1, 2002 (Appendix D).

D. Harvest attributable to commercial (by gear type where applicable) and recreational fisheries, and non-harvest losses (2012)

1. Commercial Fisheries

a) Glass eel

None; glass eel fishery closed by Statute.

b) Yellow eel

	April - June	July - October	TOTAL
POUNDS	2,268	1,292	3,560
VALUE, dollars	\$1,360.80	\$775.20	\$2,136.00

The distribution of these landings by county and month may be confidential if there are a low number of fishers participating. In some previous years, pounds harvested had been reported by months and counties, but could not be so reported for 2012 due to the low number of participating fishers.

2. Recreational Fisheries

The database from the Marine Recreational Fisheries Statistics Survey (MRFSS) was queried for reports of eel catches in Connecticut in 2012. An estimated total of zero eels was calculated as harvested by recreational anglers in 2012.

E. Review of progress in implementing habitat recommendations

1. Habitat Conservation

Fisheries staff reviews applications for permitted activities for impact on fisheries habitat. After consulting with the Inland Fisheries Division (IFD) and Marine Fisheries Division, the IFD's Habitat, Conservation, and Enhancement Program advises staff within regulatory divisions on the value of habitat that could be impacted by permitted activities and on ways to avoid deleterious impacts on fisheries resources. American eel habitat is protected in this process.

2. Restoring Access to Historical Habitat

The DEEP has a program to restore/enhance access by American eel into historic habitat in Connecticut by installing eel passes at dams in cooperation with private partners, and requiring dam owners to provide both upstream and downstream passage for American eel at their dams as part of the permitting process.

The interim eel pass constructed in 2005 by FLPR at the Stevenson Dam (Housatonic River) was lost during a high flow event in October 2005. FLPR planned to build and operate another interim eel pass starting in the 2009 season. Several attempts have meet with disappointingly low numbers of eel. FLPR plans to build and install a floating eel pass that will rest on a small barge during the 2013 season. This device will have the ability to be relocated along the spillway and may provide helpful insight as to where to site the permanent eel pass.

The DEEP is planning repairs to the state-owned Wyassup Lake Dam on Wyassup Brook in the town of North Stonington. The IFD was successful in establishing a permit condition of the concurrent installation of an eel pass, which has been incorporated into the design. Construction of this eel pass was completed in late 2012.

a. Eel passes previously constructed:

DAM	STREAM	OWNER	STATUS
Jordan Mill Pond Dam	Jordan Brook	Town of Waterford	Operational
Hanover Dam	Quinnipiac River	Town of Meriden	Operational
Babcock Pond Dam	Pine Brook	DEEP	Operational
Tunnel Dam	Quinebaug River	Firstlight	Operational
Ingham Hill Pond Dam	Fishing Brook	DEEP	Operational
Bunnells Pond Dam	Pequonnock River	DEEP	Operational
Clarks Pond Dam	Indian River	Town of Milford	Operational
Greenville Dam	Shetucket River	City of Norwich	Operational
Occum Dam	Shetucket River	City of Norwich	Operational
Kinneytown Dam	Naugatuck River	DEEP	Reconstruction in 2012
Lake Whitney Dam	Mill River	Regional Water Authority	Operational
<i>continued next page</i>			

DAM	STREAM	OWNER	STATUS
Lees Pond Dam	Saugatuck River	Westport YMCA	Operational
Leesville Dam	Salmon River	DEEP	Operational
Lower Millpond Dam	Mill Brook	DEEP	Not Operating
Mianus Pond Dam	Mianus River	Town of Greenwich	Operational
Aspinook Dam	Quinebaug River	Summit Hydro	Operational
StanChem Dam	Mattabesset River	DEEP	Operational
Rainbow Dam (interim)	Farmington River	DEEP	Operational
Wallace Dam	Quinnipiac River	DEEP	Constructed in 2012

b. Eel passes planned for the future:

DAM	STREAM	PLANNED START DATE	STATUS
Derby Dam	Housatonic River	2004	Delayed
Stevenson Dam (interim)	Housatonic River	2005	Reconstruction in 2010
Stevenson Dam (permanent)	Housatonic River	2014	Construction in 2014
Shepaug Dam	Housatonic River	2024	2024
Bulls Bridge Dam	Housatonic River	2024	2024
Tingue Dam	Naugatuck River	2001	Construction in 2013
Hallville Pond Dam	Poquetanuck Brook	2011	Construction in 2013
Taftville Dam	Shetucket	2010	Construction begun in 2011
StanChem Dam	Mattabesset River	2013	Construction in 2013
Wyassup Lake	Wyassup Brook	2011	Construction in 2013

IV. Planned management programs for the current calendar year.

A. Summarize regulations that will be in effect (provide copy if different from III-c).

No changes anticipated beyond what was reported in III-c.

B. Summarize monitoring programs that will be performed.

1. Mandated monitoring for glass eels as reported in III-B-1.
2. Non-mandated eel migration monitoring of eel passes and eel-avators at: Greeneville Dam, Occum Dam, Kinneytown Dam, Mill River Eel Pass, Lower Millpond Dam, Bunnells Pond Dam, and Rainbow Dam as reported in III-B-2.
3. Non-mandated population monitoring in several index streams including Pine Brook and selected tributaries of the Housatonic, Scantic, and Natchaug rivers.

C. Highlight any changes from the previous year.

1. Installed eel passage at the Wallace Dam alongside of the Haakonsen Fishway.
2. Initiated silver eel monitoring at the Haakonsen Fishway (Quinnipiac River).

V. Plan specific requirements.

A. Biological data taken from sub-samples of fisheries

1. Commercial fisheries
Not available.
2. Recreational fisheries
Not available.

B. Estimation of percent of harvest going to food versus bait

Anecdotal information from eel potters implies that the majority of harvest is going to bait, but no specific estimates are available.

C. Harvest data provided as CPUE (by life stage and gear type)

YEAR	LIFE STAGE	GEAR TYPE	CPUE	TYPE OF EFFORT
1995	Yellow	Pot	2.624	Lbs./trap haul
1995	Glass	Dipnet	Not available	Grams/hour
1996	Yellow	Pot	1.618	Lbs./trap haul
1996	Glass	Dipnet	174.058	Grams/hour
1997	Yellow	Pot	1.240	Lbs./trap haul
1997	Glass	Dipnet	151.235	Grams/hour
1998	Yellow	Pot	0.983	Lbs./trap haul
1998	Glass	Dipnet	135.869	Grams/hour
1999	Yellow	Pot	1.434	Lbs./trap haul
1999	Glass	Dipnet	162.244	Grams/hour
2000	Yellow	Pot	1.097	Lbs./trap haul
2000	Glass	Dipnet	11.000	Grams/hour
2001	Yellow	Pot	0.919	Lbs./trap haul
2001	Glass	Dipnet	None Harvested	Grams/hour
2002	Yellow	Pot	1.089	Lbs./trap haul
2002	Glass	Dipnet	1,709.941	Grams/hour
2003	Yellow	Pot	2.385	Lbs./trap haul
2003	Glass	Dipnet	Closed by Statute	Grams/hour
2004	Yellow	Pot	1.870	Lbs./trap haul
2004	Glass	Dipnet	Closed by Statute	Grams/hour
2005	Yellow	Pot	0.556	Lbs./trap haul
2005	Glass	Dipnet	Closed by Statute	Grams/hour
2006	Yellow	Pot	2.073	Lbs./trap haul
2006	Glass	Dipnet	Closed by Statute	Grams/hour
2007	Yellow	Pot	1.166	Lbs./trap haul
2007	Glass	Dipnet	Closed by Statute	Grams/hour
2008	Yellow	Pot	1.722	Lbs./trap haul
2008	Glass	Dipnet	Closed by Statute	Grams/hour
2009	Yellow	Pot	1.235	Lbs./trap-haul
2009	Glass	Dipnet	Closed by Statute	Grams/hour
2010	Yellow	Pot	0.459	Lbs./trap-haul
2010	Glass	Dipnet	Closed by Statute	Grams/hour
2011	Yellow	Pot	1.432	Lbs./trap-haul
2011	Glass	Dipnet	Closed by Statute	Grams/hour
2013	Yellow	Pot	1.988	Lbs./trap-haul
2013	Glass	Pot	Closed by Statute	Grams/hour

These data courtesy of the State of Connecticut DEEP Marine Fisheries Division, Catch Statistics office.

D. Permitted catch for personal use

Two pots are allowed to be fished without a license. There are no reporting requirements and therefore there are no estimates of catch and harvest.

E. Characterization of Other Losses

1. Impingement/entrainment mortalities of eel at power generation facilities, water intakes, and navigational locks.

The DEEP has not undertaken special investigations to determine losses at industrial plants in the state, however, the agency monitors such fish losses at a variety of plants under the conditions of permits issued to the plants through the regulatory process. Yellow eels are rarely included in reports provided by the permittees to the DEEP and it is concluded that losses of this life stage are relatively uncommon. Silver eels are not specified in reports for water intakes at plants and if they are impinged/entrained, they are likely reported as yellow eels. Hydroelectric companies in Connecticut are not required to report impingement or entrainment of fishes. The impingement of eels is likely minor. However, the entrainment of eels, particularly silver eels, is likely to be significant. (Herein, entrainment is defined as the passage of actively migrating silver eels into and through a hydroelectric plant's turbine intake system.) Staff have been actively participating in the growing debate over silver eel entrainment at hydroelectric plants and have attended numerous meetings and workshops where this matter has been discussed. Losses at the state's major hydroelectric plants have not been quantified, but based on existing information about the design and operation of these projects, in the judgment of staff the losses may be characterized as follows:

PROJECT	RIVER	LEVEL OF LOSSES	EXPLANATION
Bulls Bridge	Housatonic	Low	Few eels above
Shepaug	Housatonic	Low	Few eels above
Stevenson	Housatonic	Low	Few eels above
Derby	Housatonic	Moderate	Frequent spill
Kinneytown	Naugatuck	Moderate	Little spill but two bypasses exist
Colebrook	Farmington	Low	Few eels above, large turbines
Goodwin	Farmington	Low	Few eels above, large turbines
Rainbow	Farmington	Moderate	Little spill but two bypasses exist
Greeneville	Shetucket	Low	Frequent spill and fish bypass exists
Taftville	Shetucket	Moderate	Little spill but two bypasses exist
Occum	Shetucket	Moderate	Occasional spill and two bypasses exist
Scotland	Shetucket	High	Little spill, no bypass
Willimantic	Willimantic	Unknown	Lack information
Tunnel	Quinebaug	High	Little spill, no bypass
Aspinook	Quinebaug	Unknown	Lack information
Rajak	Quinebaug	High	Little spill; low flow pipe has a turbine
Rogers	Quinebaug	Unknown	Lack information

There are no navigational locks in the state. Of the many drinking water reservoirs in Connecticut, it is known that Hemlock Reservoir in Fairfield County entrains silver eels during the fall migration. The water company, the DEEP, and The Nature Conservancy are cooperating in a study of the effectiveness of silver eel passage improvements in this highly interconnected and regulated water supply reservoir system. These improvements include migratory deterrents designed to guide silver eels away from entrainment hazards into the submerged entrance of the downstream eel pass. Preliminary tests that were conducted in 2009 – 2011 showed that the facility safely passed silver eels but not as effectively as hoped. A tagging study in association with the Silvio Conte Anadromous Fish Research Center (USGS, Turners Falls, MA) and Sacred Heart University (Fairfield, CT) was conducted in 2012. Silver eels from the Connecticut River were tagged with radio-tags and released upstream of the dam that diverts water to the Hemlock Reservoir and receivers tracked the migratory routes of these eels. Results indicated that eel will go over the spillway when there are a couple of inches of spill. The full results of this study are beyond the scope of this report but the parties intend to continue to study this system to develop effective eel protection measures.

2. Bycatch mortalities in commercial and recreational fisheries

There is no information on this source of mortality.

3. Confiscated poundage from illegal or undocumented fisheries (i.e. poaching)

During the years 1994 – 1998, the amount of confiscated eels from illegal fishing averaged about 3 pounds of glass eels per year. In 1999 and 2000, that amount dropped to 1.5 pounds. During the years 2001 – 2009 no eels were confiscated. No eels were confiscated in 2012.

4. Scientific losses

Eels and other fish species are collected as part of broad sampling and testing for contaminants. The sample size for such testing is very small. Every few years eels are targeted specifically. Several years ago 15 eels were collected from the Housatonic River for PCB analysis. The only known eel study is the young-of-year monitoring described previously in this document, conducted by the Department. In this study, 60 glass eels were targeted each week for lethal sampling. In 2012, 876 glass eels were lethally sampled.

5. Mass mortality of eel due to disease, spills, or other causes

None reported in 2012.

VI. Projects planned for the next five years (2012 – 2017).

A. Fishery dependent monitoring.

1. Continue fishery dependent monitoring and reporting with data provided by the Marine Fisheries Division's Commercial and Recreational Fisheries Statistics and Management Program.
2. Continue to monitor confiscated poundage from illegal or undocumented fisheries (i.e. poaching) with data provided by the Environmental Conservation (Encon) Police.
3. The Department will explore opportunities to gather sex ratio, age structure, length, and weight data from commercially caught eels, per Addendum I.

B. Fishery independent monitoring.

1. Continue to monitor eel passage at Fishing Brook and Mill River eel passes, Greeneville, Occum, Kinneytown, Lower Millpond, Tunnel, Bunnells Pond, and Rainbow dams, Haakonsen Fishway and Hemlock Reservoir.
2. Make necessary repairs to the Kinneytown eel pass.
3. Continue to provide unmonitored eel passage at Aspinook, Leesville, Lees Pond, Clarks Pond, Hanover Pond, Babcock Pond, Wallace, and Lake Forest dams.
4. Continue to improve passage at man-made barriers as opportunities arise.
5. Work with water companies to reduce entrainment of silver eels migrating from water supply reservoirs.
6. Establish a silver eel monitoring site.
7. Initiate silver eel monitoring at StanChem Fishway (Mattabessett River).

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APPENDIX A.

MANDATED DUTIES

Table 1. Glass eel catch data, Fishing Brook Index Site, 2012.

Table 2. Glass eel sampling data, Fishing Brook Index Site, 2011.

Table 3. Glass eel sampling data, Fishing Brook Index Site, 2011: captured glass eels by pigment class.

Figure 1. Number of glass eels captured, Fishing Brook Index Site, 2011.

Figure 2. Water temperature and number of glass eels captured, Fishing Brook Index Site, 2011.

Figure 3. River discharge and number of glass eels captured, Fishing Brook Index Site, 2011.

Figure 4. Mean length of glass eels by sample, Fishing Brook Index Site, 2011.

Figure 5. Mean weight of glass eels by sample, Fishing Brook Index Site, 2011.

Figure 6. Captured glass eels by pigment class, Fishing Brook Index Site, 2011.

Table 1. Fishing Brook Eel Pass data, 2012.

<i>Date</i>	<i>Hours Fished</i>	<i>Water Temperature (C)</i>	<i>River Discharge (cfs)</i>	<i>Number of YOY Eels</i>	<i>YOY CPUE</i>
5-March	Deployed	4	6.16	0	0.000
6-March	20.25	2	5.08	0	0.000
7-March	26.00	6	4.93	0	0.000
8-March	19.00	6	4.85	0	0.000
9-March	24.75	7	4.70	1	0.040
12-March	71.75	6	3.93	4	0.056
13-March	24.50	8	4.00	2	0.082
14-March	24.50	9	3.93	11	0.450
15-March	24.00	9	3.62	19	0.792
16-March	23.00	9	3.54	24	1.044
19-March	72.50	9	3.23	14	0.193
20-March	23.00	9	3.08	16	0.696
21-March	24.00	13	3.08	74	3.083
22-March	24.00	15	3.08	177	7.375
23-March	24.00	15	3.00	100	4.167
26-March	72.00	11	2.62	492	6.833
27-March	23.75	9	2.31	86	3.621
28-March	24.25	10	3.39	30	1.237
29-march	24.00	10	5.08	1	0.042
30-March	24.00	9	3.39	1	0.042
2-April	72.00	7	4.54	10	0.139
3-April	24.00	8	3.54	5	0.208
5-April	52.00	11	2.62	2,157	41.481
6-April	23.00	10	2.46	1,485	64.565
9-April	69.00	10	2.16	10,000	144.928
10-April	24.00	10	2.00	3,872	161.333
11-April	24.00	13	1.92	1,318	54.917
12-April	26.50	12	1.92	354	13.358
13-April	24.50	12	1.92	272	11.102
16-April	72.00	15	1.85	2,115	29.375
17-April	24.00	23	1.69	313	13.042
18-April	24.00	20	1.46	1,184	49.333
19-April	24.00	no data	1.46	236	9.833
20-April	24.00	17	1.46	1,985	82.708
23-April	68.75	12	32.34	784	11.404
24-April	24.25	12	11.55	33	1.361
25-April	24.00	13	6.47	81	3.375
26-April	24.00	no data	5.24	215	8.958
27-April	24.00	13	4.85	54	2.250
30-April	72.00	12	3.54	113	1.569
1-May	24.00	14	10.01	196	8.167
2-May	24.00	11	8.47	13	0.542
3-May	24.00	11	6.39	54	2.250
4-May	24.00	11	6.62	34	1.417
7-May	72.00	13	4.24	775	10.764
8-May	24.00	15	3.93	120	5.000
10-May	53.00	no data	37.73	241	4.547
11-May	22.00	13	18.84	4	0.078

(continued on next page)

Table 1. Fishing Brook Eel Pass data, 2012 (continued).

<i>Date</i>	<i>Hours Fished</i>	<i>Water Temperature (C)</i>	<i>River Discharge (cfs)</i>	<i>Number of YOY Eels</i>	<i>YOY CPUE</i>
14-May	72.00	19	6.78	146	6.083
15-May	24.00	16	13.86	56	0.778
16-May	24.00	15	20.79	61	2.542
17-May	24.00	15	11.55	7	0.292
18-May	24.00	16	7.47	55	0.292
21-May	72.00	no data	5.00	266	3.694
22-May	22.00	15	10.01	75	3.409
23-May	24.00	19	8.47	32	1.333
24-May	24.00	20	5.78	37	1.542
25-May	24.00	17	4.93	67	2.792
30-May	118.50	21	2.70	193	1.629
1-June	48.50	23	2.00	23	0.474
4-June	72.00	20	6.54	15	0.208
6-June	48.00	16	4.24	13	0.271
8-June	48.00	16	3.77	23	0.479
11-June	72.00	19	2.16	10	0.139
12-June	24.00	20	2.00	2	0.083
14-June	48.00	18	7.62	6	0.125
15-June	24.00	19	4.31	1	0.042
18-June	72.00	19	2.00	6	0.083
19-June	24.00	20	1.77	3	0.125
22-June	72.00	22	1.08	8	0.111
25-June	72.00	no data	12.32	18	0.250
26-June	24.00	19	13.09	7	0.292
28-June	48.00	no data	2.93	9	0.188
2-July	96.00	24	5.47	27	0.000
5-July	72.00	23	2.08	7	0.000
6-July	24.00	23	1.62	5	0.000
<i>Total</i>	<i>2,945.25</i>			<i>30,253</i>	
<i>Mean</i>	<i>39.27</i>	<i>13</i>	<i>5.79</i>		<i>10.272</i>

Table 2. Fishing Brook Eel Pass, 2012: Glass eel length and weight data from samples.

<i>Sampling Date</i>	<i>Number Sampled</i>	<i>Mean Length (mm)</i>	<i>Mean Weight (g)</i>
12-March	4	58.8	0.16
13-March	2	58.3	0.14
14-March	11	56.8	0.13
15-March	19	55.6	0.14
16-March	24	57.4	0.13
19-March	14	57.3	0.14
20-March	16	56.9	0.14
21-March	30	56.2	0.12
27-March	60	57.3	0.13
2-April	10	58.3	0.15
3-April	5	55.3	0.13
5-April	45	57.3	0.14
10-April	60	56.7	0.11
16-April	60	56.6	0.13
23-April	60	55.9	0.12
30-April	60	56.5	0.12
7-May	60	57.0	0.12
14-May	60	56.6	0.13
21-May	60	56.4	0.12
30-May	60	56.8	0.12
4-June	15	59.6	0.16
6-June	13	56.7	0.13
8-June	23	55.8	0.12
11-June	10	55.4	0.12
12-June	2	55.8	0.14
14-June	6	55.1	0.12
15-June	1	60.5	0.14
18-June	6	56.2	0.12
19-June	3	58.1	0.13
22-June	8	57.8	0.13
25-June	18	57.4	0.12
26-June	7	58.6	0.15
28-June	9	60.0	0.15
2-July	27	57.5	0.14
5-July	7	55.0	0.11
6-July	5	57.8	0.14
<i>Total</i>	<i>876</i>		
<i>Mean</i>		<i>57.1</i>	<i>0.13</i>

Table 3. Fishing Brook Eel Pass, 2012: Glass eel pigment classification data from samples.

<i>Sampling Date</i>	<i>Percentage of Total Glass Eels in Sample</i>						
	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4</i>	<i>Class 5</i>	<i>Class 6</i>	<i>Class 7</i>
12-March	100	0	0	0	0	0	0
13-March	100	0	0	0	0	0	0
14-March	18	64	18	0	0	0	0
15-March	10	74	16	0	0	0	0
16-March	36	58	6	0	0	0	0
19-March	21	64	15	0	0	0	0
20-March	12	63	25	0	0	0	0
21-March	7	40	50	3	0	0	0
27-March	15	43	37	3	2	0	0
2-April	10	70	20	0	0	0	0
3-April	40	40	20	0	0	0	0
5-April	24	33	16	13	11	3	0
10-April	17	24	19	7	0	0	0
16-April	0	25	37	25	10	3	0
23-April	0	0	5	10	18	30	37
30-April	2	0	18	15	20	35	10
7-May	0	12	15	3	15	22	25
14-May	2	3	2	13	12	23	45
21-May	0	2	8	12	17	27	35
30-May	0	0	2	22	32	30	15
4-June	0	0	7	7	13	27	46
6-June	8	0	0	0	15	8	69
8-June	22	17	4	9	13	4	31
11-June	0	10	0	10	10	10	60
12-June	0	0	0	0	50	0	50
14-June	0	0	33	17	17	33	0
15-June	0	0	0	0	0	100	0
18-June	0	17	0	17	33	0	33
19-June	0	33	0	33	0	34	0
22-June	0	12	25	13	0	25	25
25-June	0	0	0	6	11	22	61
26-June	0	0	0	0	14	28	58
28-June	11	0	0	0	0	44	45
2-July	0	0	4	11	7	18	60
5-July	0	14	0	14	0	14	58
6-July	0	0	0	20	20	20	40
<i>Total percent sampled by pigment class</i>							
	8	20	16	11	11	15	20

Figure 1. Number of glass eels captured, Fishing Brook Index Site, 2012

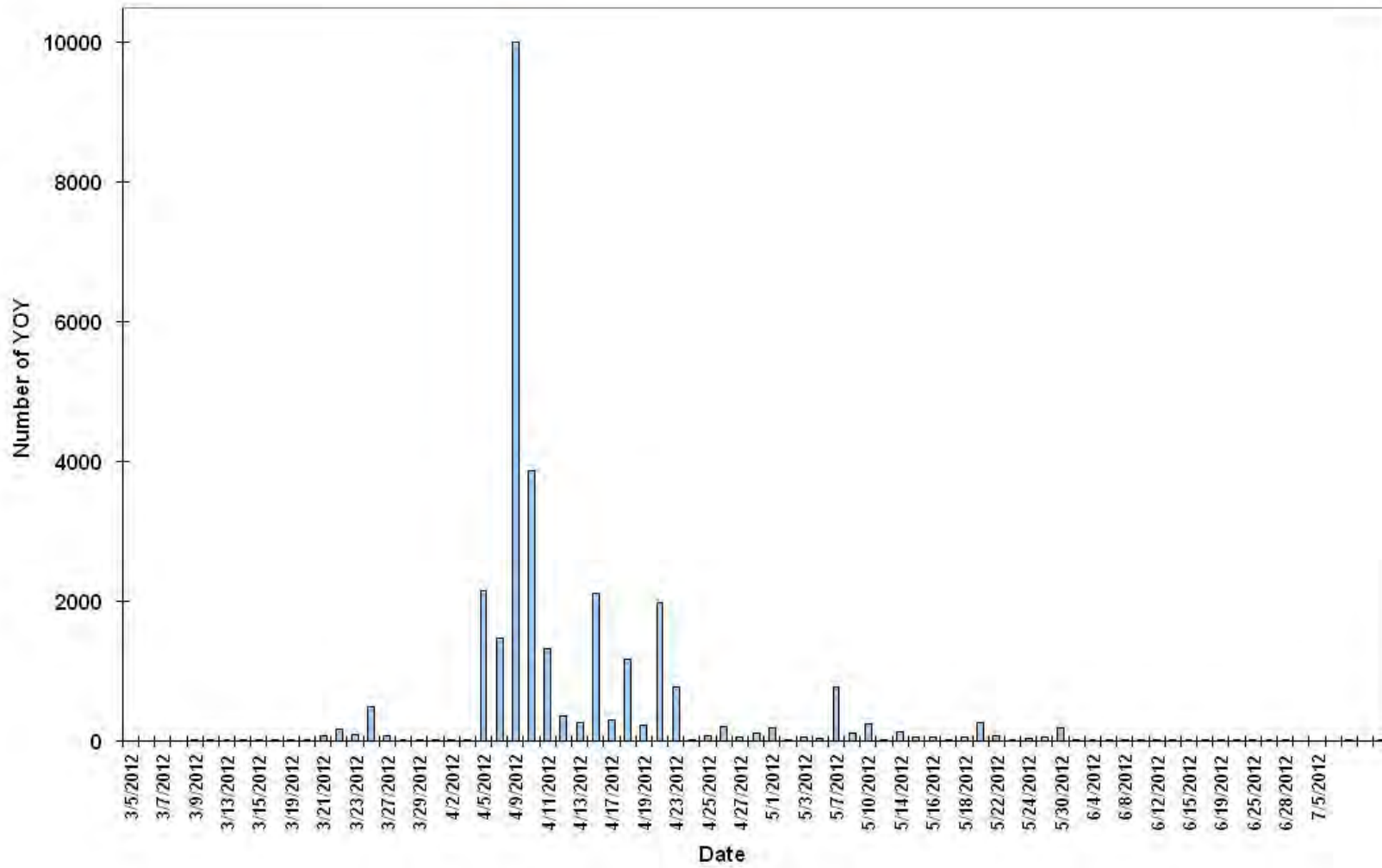


Figure 2. Water temperature and number of glass eels captured, Fishing Brook Index Site, 2012

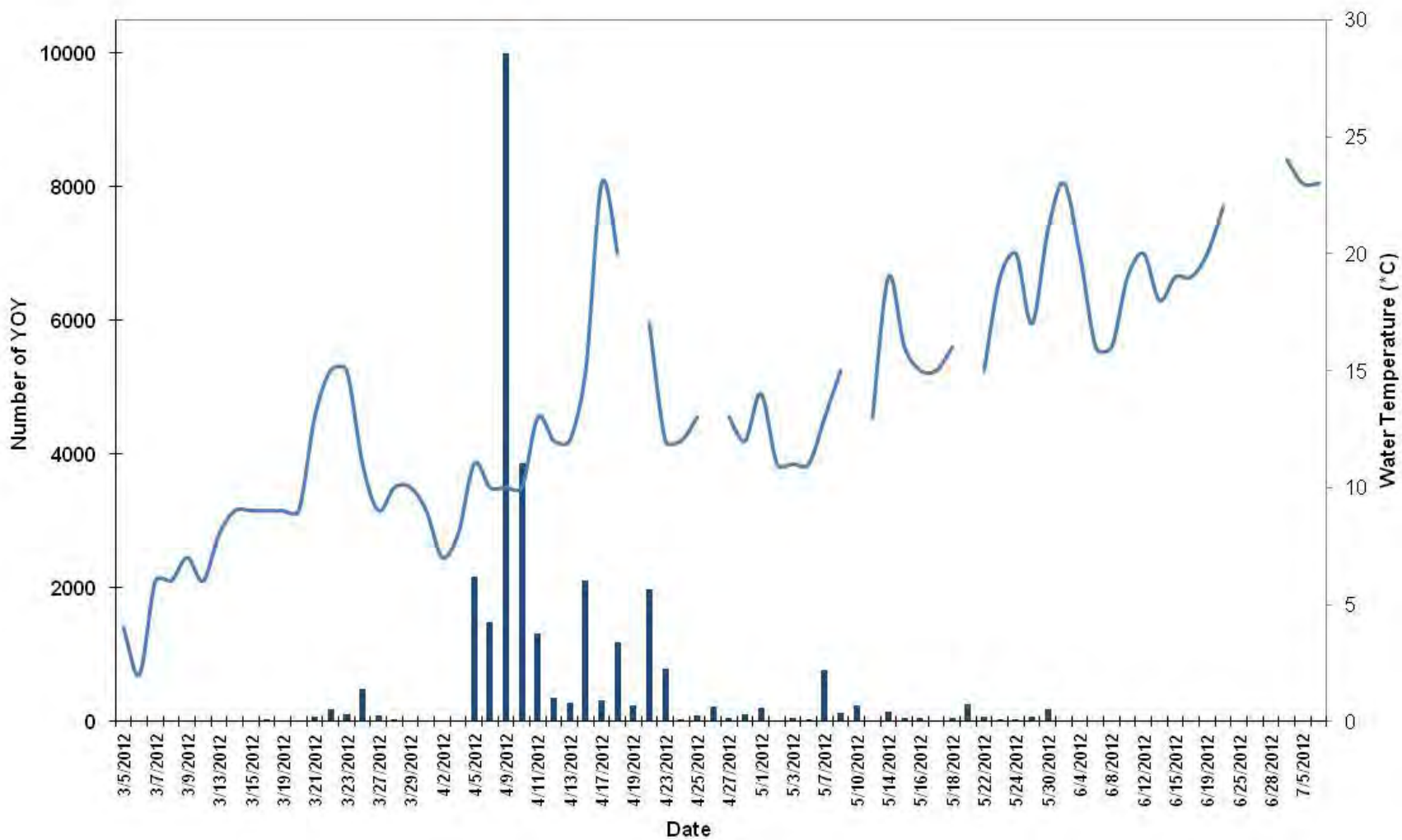


Figure 3. River discharge and number of glass eels captured, Fishing Brook Index Site, 2012

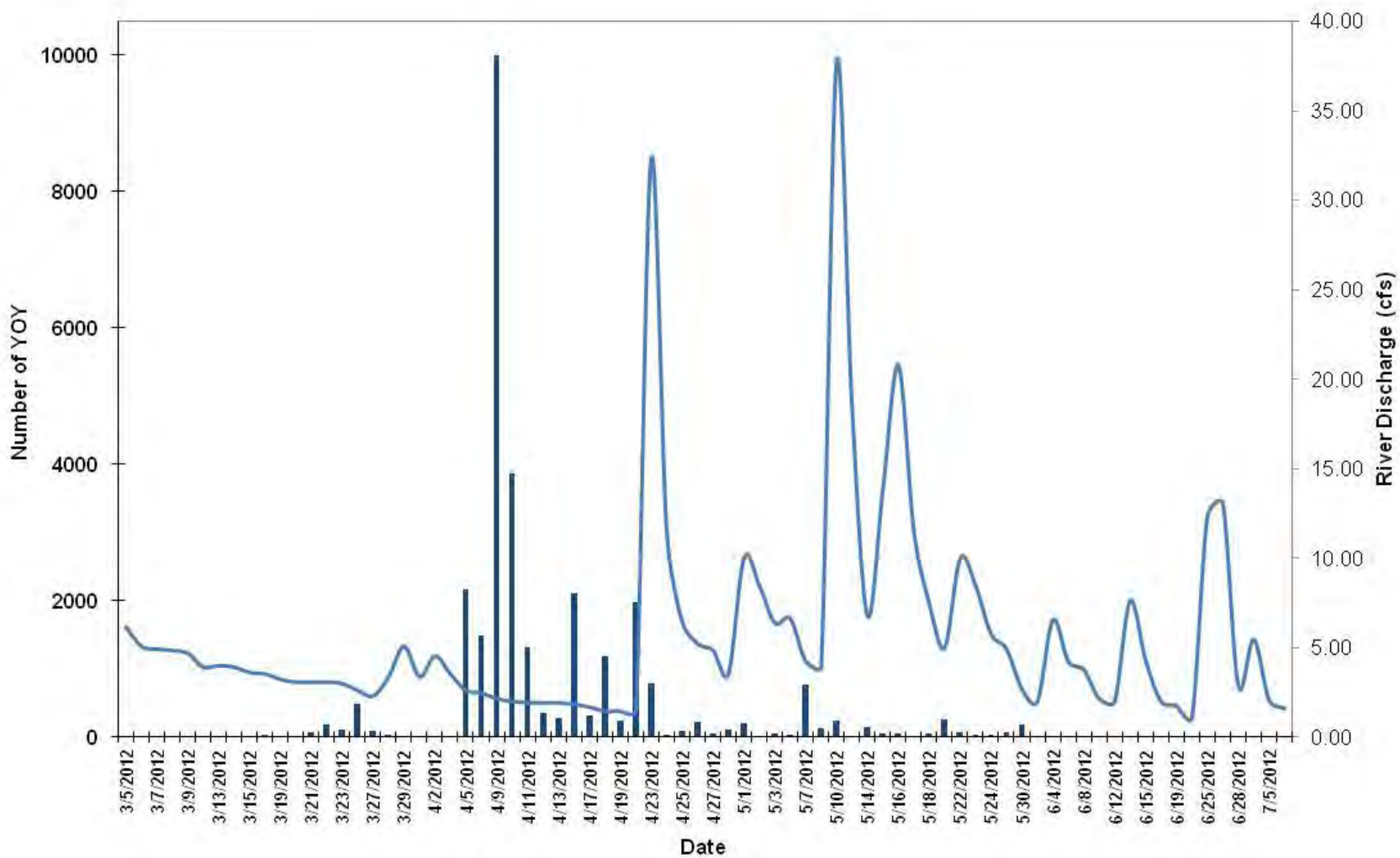


Figure 4. Mean total length of glass eels by sample, Fishing Brook Index Site, 2012

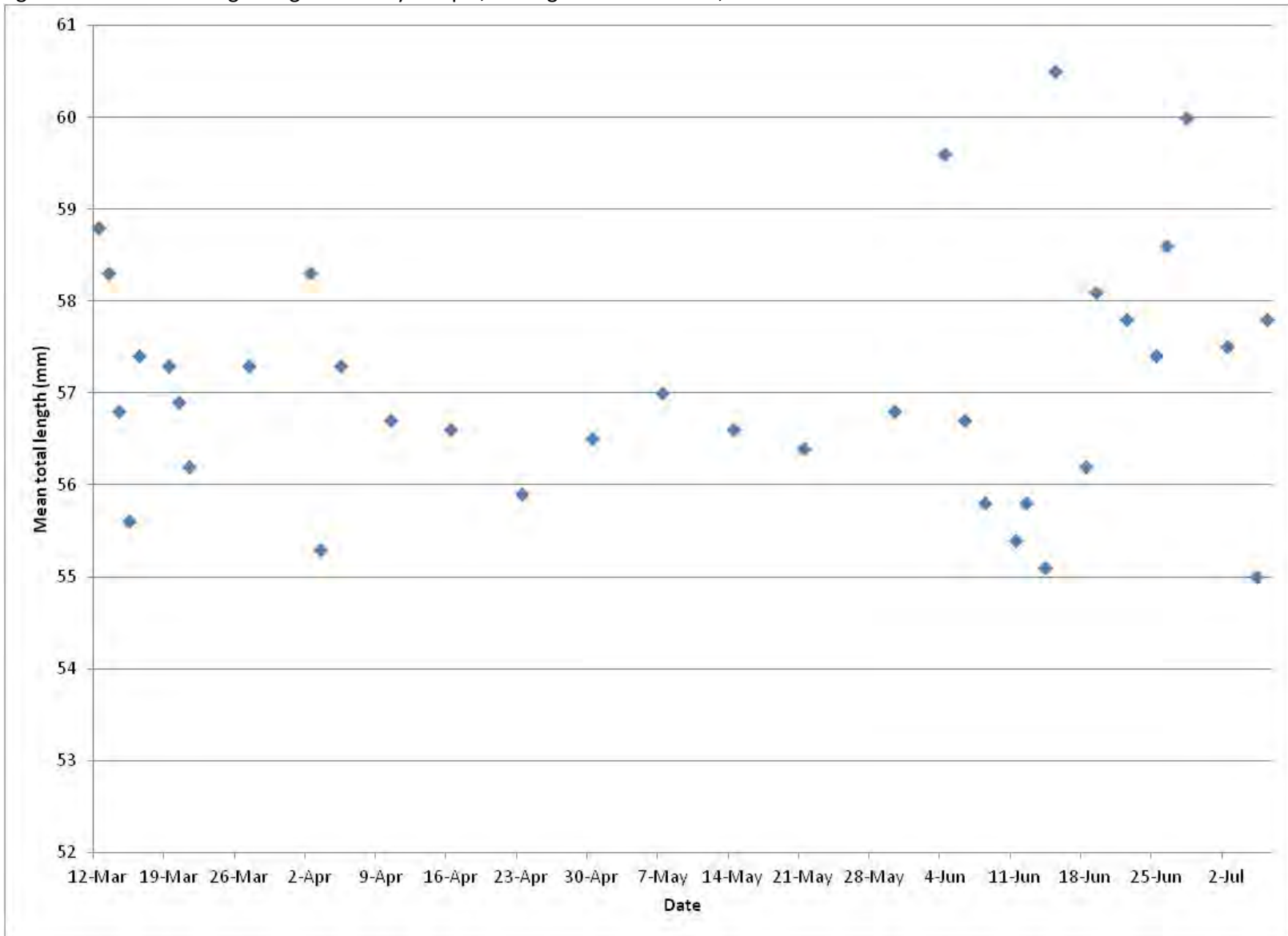


Figure 5. Mean weight of glass eels by sample, Fishing Brook Index Site, 2012

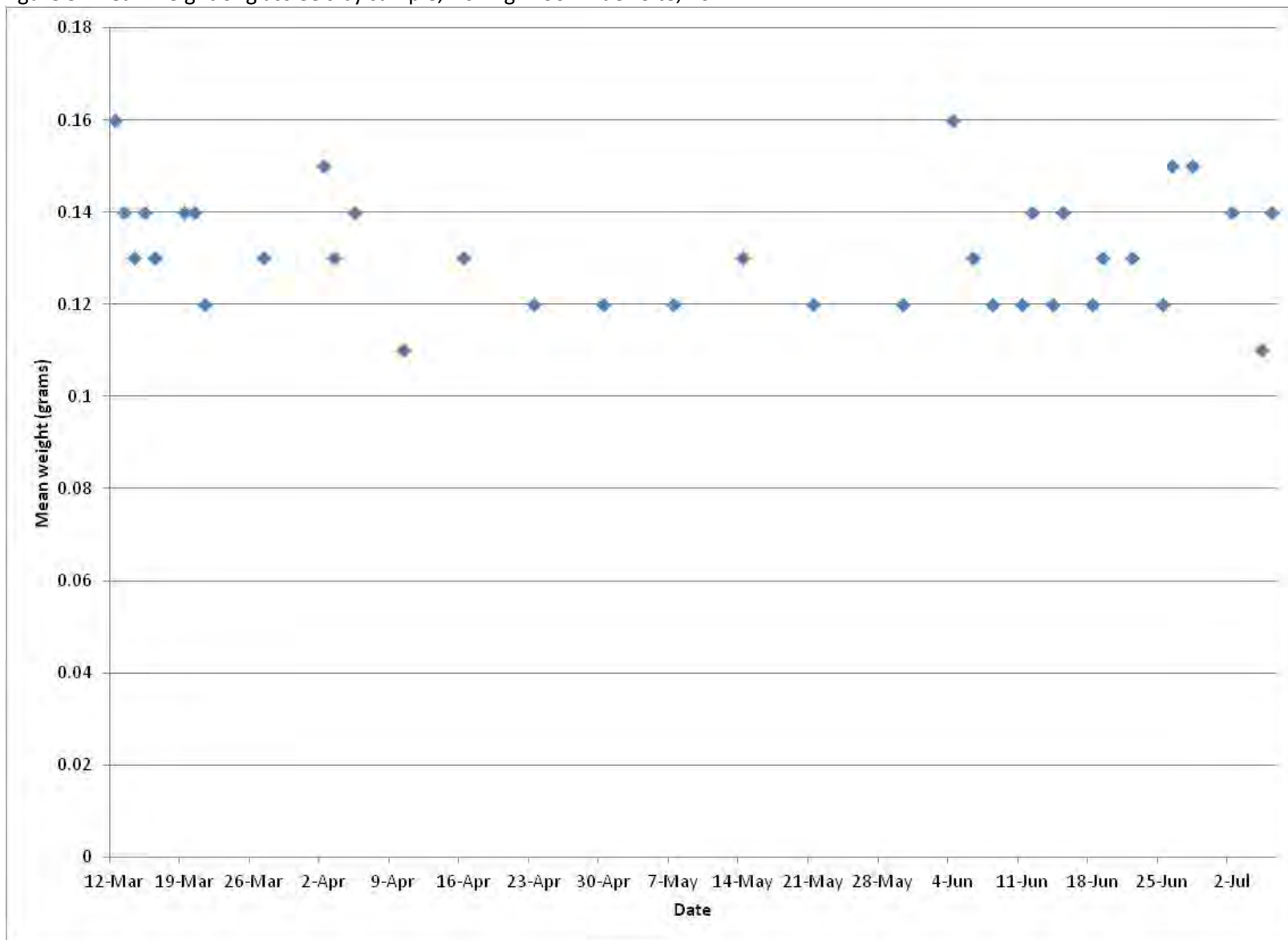
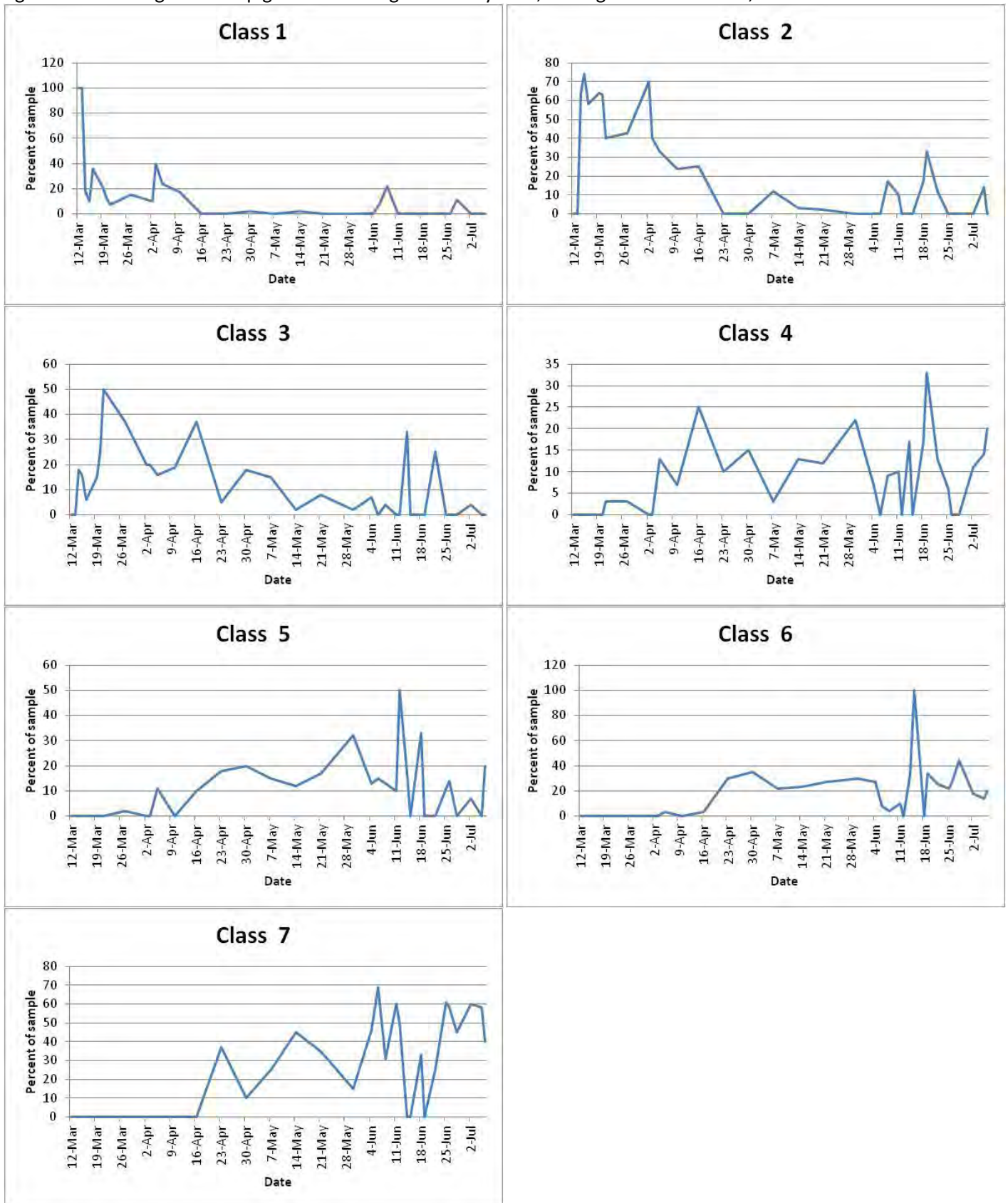


Figure 6. Percentage of each pigment class of glass eels by date, Fishing Brook Index Site, 2012



APPENDIX B.

NON-MANDATED ACTIVITIES

Table 1. Number of elver and yellow eels passed at the Greeneville Eel Lift, 2012.

Table 2. Number of elver and yellow eels passed at the Mill River Eel Pass, 2012.

Table 3. Number of elver and yellow eels passed at the Rainbow Dam Eel Pass, 2012.

Table 1. Number of elver and yellow eels passed at the Greeneville Eel Lift, 2012

<i>Date</i>	<i>Hours Fished</i>	<i>Water Temperature</i>	<i>-----Number of Eels-----</i>		
			<i>Elver</i>	<i>Yellow</i>	<i>Total</i>
20-April	Deployed				
23-April	68.0	16	79	0	79
25-April	48.0	14	3	0	3
27-April	50.0	13	5	0	5
3-May	141.5	12	34	0	34
8-May	121.5	11	29	0	29
11-May	72.0	14	1	0	1
15-May	96.0	19	50	1	51
17-May	49.0	20	30	3	33
21-May	93.0	19	109	0	109
23-May	52.0	20	30	0	30
25-May	45.5	19	54	1	55
29-May	96.5	23	105	1	106
30-May	23.0	22	75	3	78
1-June	48.0	22	167	0	167
6-June	120.0	16	23	0	23
7-June	24.0	17	7	0	7
8-June	24.0	19	21	0	21
12-June	96.0	19	73	1	74
18-June	145.5	20	105	0	105
22-June	94.5	20	100	0	100
2-July	239.0	22	45	0	45
13-July	265.0	23	152	0	152
18-July	121.0	23	153	2	155
26-July	192.5	22	94	0	94
1-August	142.5	21	13	0	13
<i>Totals</i>	<i>2,468.5</i>		<i>1,558</i>	<i>13</i>	<i>1,571</i>

Table 1. Number of elver and yellow eels passed at the Mill River Eel Pass, 2012

<i>Date</i>	<i>Hours Fished</i>	<i>Water Temperature</i>	<i>-----Number of Eels-----</i>		<i>Total</i>
			<i>Elver</i>	<i>Yellow</i>	
8-May	Deployed	15			
15-May	166.50	16	25	7	32
24-May	215.25	19	59	5	64
30-May	145.25	21	96	4	100
12-June	313.00	18	240	11	251
26-June	336.00	21	219	9	228
2-July	144.00	26	48	0	48
10-July	192.00	27	56	3	59
16-July	145.00	28	28	3	31
26-July	238.00	25	111	6	117
3-August	193.00	24	218	19	237
10-August	167.00	25	98	2	100
16-August	144.00	23	293	32	325
24-August	192.00	22	52	1	53
31-August	167.50	20	10	0	10
6-September	144.50	20	2	0	2
14-September	192.50	18	3	2	5
24-September	239.50	16	9	0	9
9-October	360.00	15	6	0	6
18-October	216.00	13	18	0	18
26-October	192.00	14	70	0	70
<i>Totals</i>	<i>4,103.00</i>		<i>1,661</i>	<i>104</i>	<i>1,765</i>

Table 2. Number of elver and yellow eels passed at the Rainbow Dam Eel Pass, 2012.

<i>Date</i>	<i>Hours Fished</i>	<i>Water Temperature</i>	<i>-----Number of Eels-----</i>		
			<i>Elver</i>	<i>Yellow</i>	<i>Total</i>
19-July	Deployed	n.a.			.
21-July	47.75	n.a.	25	0	25
25-July	94.25	n.a.	27	1	28
31-July	137.50	n.a.	39	0	39
7-August	168.00	n.a.	1	0	1
16-August	215.50	n.a.	66	1	67
24-August	195.75	n.a.	33	0	33
31-August	168.75	n.a.	4	0	4
<i>Totals</i>	<i>1,027.50</i>		<i>195</i>	<i>2</i>	<i>197</i>

26-142A - COMMERCIAL FISHING IN THE INLAND AND MARINE DISTRICTS

26-142a-1. Species

Subject to the provisions of section 26-142a-3a through section 26-142a-7a of these regulations, only the following species may be taken for commercial purposes in those areas of the inland district described in section 26-142a-2 hereof:

- (a) Carp (*Cyprinus carpio*)
- (b) Common sucker (*Catostomus commersoni*)
- (c) American eel (*Anguilla rostrata*)
- (d) Sea lamprey (*Petromyzon marinus*)
- (e) Rainbow smelt (*Osmerus mordax*)
- (f) Atlantic tomcod or "frostfish" (*Microgadus tomcod*)
- (g) Hickory shad (*Alosa mediocris*)
- (h) American shad (*Alosa sapidissima*)
- (i) Alewife (*Alosa pseudoharengus*)
- (j) Blueback (glut or river) herring (*Alosa aestivalis*)
- (k) White perch (*Morone americana*)
- (l) Yellow perch (*Perca flavescens*)
- (m) Catfish species (*Ictalurus* spp.)

Bait species. The following species of minnows and other bait species only may be taken commercially for sale as bait:

- (1) golden shiner or "pond shiner" (*Notemigonus crysoleucas*);
- (2) common shiner (*Notropis cornutus*);
- (3) fallfish (*Semotilus corporalis*);
- (4) creek chub (*Semotilus atromaculatus*);
- (5) spottail shiner or "river bait" (*Notropis hudsonius*);
- (6) bridle shiner (*Notropis bifrenatus*);
- (7) blacknose dace (*Rhinichthys atratulus*);
- (8) longnose dace (*Rhinichthys cataractae*);
- (9) pearl dace (*Semotilus margarita*);
- (10) bluntnose minnow (*Pimephales notatus*);
- (11) fathead minnow (*Pimephales promelas*);
- (12) cutlips minnow (*Exoglossum maxillingua*);
- (13) chub sucker (*Erimyzon oblongus*);
- (14) banded killifish (*Fundulus diaphanus*);
- (15) mummichug (*Fundulus heteroclitus*);

- (16) striped killifish (*Fundulus majalis*);
- (17) tidewater silverside (*Menidia beryllina*);
- (18) Atlantic silverside (*Menidia menidia*);
- (19) frogs (except northern leopard frog, *Rana pipiens*);
- (20) perch bugs;
- (21) helgramites;
- (22) mayfly nymphs;
- (23) other aquatic insects;
- (24) crayfish.
- (25) Any species of crustaceans, provided lobsters and blue crabs shall meet minimum legal size requirements and be taken by legal methods, as specified in Title 26, Chapter 490 of the Connecticut General Statutes.

Original text, 12/15/2000

1996

26-142a-4. Seasons

- (a) There shall be no closed season on carp, suckers, eels and minnows taken for commercial purposes in the waters described in section 26-142a-2.

Effective September 18, 1990

Effective March 31, 2003 removed obsolete closed season for purse seine.

26-142a-6. Mesh size and specifications

Nets of any type used for commercial fishing shall conform to the mesh size and specifications herein described:

- (d) Scap nets or scoop nets may have a mesh of any size, except that for the taking of American shad such nets shall have a mesh size of not less than five inches when stretched. Scoop or scap nets for the taking of alewives and river herring means a single hoop attached to a handle with the hoop not more than thirty-six inches across the widest point and a net with a mesh bag not more than thirty-six inches from the hoop to the end of the bag. Such net shall be constructed of flexible mesh material and shall be manually operated by a single individual. The use of any such net constructed of metal mesh or stiff plastic mesh is prohibited. Scoop or scap nets for the taking of glass eels means a single hoop attached to a handle with the hoop not more than thirty-six inches across the widest point and a net with a mesh bag of any material not more than thirty-six inches from the hoop to the end of the bag. Scoop nets used to take glass eels shall be manually operated by a single individual.

Effective July 26, 1996 amended June 27, 1997, June 26, 1998, October 30, 1998, July 21, 1999

Scup and black sea bass trawl net mesh size amended 06/25/2002

26-142a-12. Taking and sale of bait species

- (b) In addition to the bait species listed in subsection (a), the following species, if legally taken under the appropriate commercial license and meeting the minimum legal length requirements,

specified in section 26-142a-8a of these regulations, may be offered for sale as bait under a bait dealer's license:

- (1) menhaden (*Brevoortia tyrannus*);
- (2) alewives (*Alosa pseudoharengus*);
- (3) blueback or "glut" herring (*Alosa aestivalis*);
- (4) American eel (*Anguilla rostrata*);
- (5) butterfish (*Peprilus triacanthus*);
- (6) Atlantic mackerel (*Scomber scombrus*);
- (7) whiting (*Merluccius bilinearis*);
- (8) squid (*Loligo* sp.);
- (9) Atlantic herring (*Clupea harengus*);
- (10) Horseshoe crabs (*Limulus polyphemus*).

(c) Each bait dealer shall keep the following records on forms furnished by the department:

- (11) the date and quantity by species and source of each consignment of bait received by the licensee;
- (12) the total annual sale of bait by species made by the licensee during the license period. The above records shall be filed with the department within thirty days after the expiration date of the license.

(d) This regulation does not apply to fish used to bait lobster pots or eel pots.

Effective January 1, 1986, amended 3/31/03 added horseshoe crabs and changed name of sea herring to Atlantic

26-142a-15. When license not required

In the marine district a commercial fishing license is not required to take, for personal use only, menhaden, alewives, glut herring, sea herring, eels, lampreys and bait species by the use of cast nets, minnow traps not more than twenty inches long and fifteen inches in diameter, scoop or scap nets not more than thirty-six inches in diameter, seines not more than thirty feet in length and not more than two eel pots.

Effective April 22, 1994.

26-159A - COMMERCIAL AND SPORT FISHING IN THE MARINE DISTRICT

26-159a-4. Minimum lengths

Emergency Declaration: Subsection (a)(10) is changed. Effective 5/15/03 Black Sea Bass minimum length limit – 12 inches.

- (a) No person shall possess any fish of the following species taken by sport fishing methods if it is less than the identified length as measured from the tip of the snout to the end of the tail:
 - (13) Scup (porgy) (*Stenotomus chrysops*): 10 inches;
 - (14) Winter flounder (*Pseudopleuronectes americanus*): 12 inches;
 - (15) Summer flounder (fluke) (*Paralichthys dentatus*): 17 inches;

- (16) Atlantic cod (*Gadus morhua*): 23 inches;
- (17) Haddock (*Melanogrammus aeglefinus*): 23 inches;
- (18) Yellowtail flounder (*Pleuronectes ferrugineus*): 13 inches;
- (19) Blackfish (*Tautoga onitis*): 14 inches;
- (20) Pollock (*Pollachius virens*): 19 inches;
- (21) Weakfish (*Cynoscion regalis*): 16 inches;
- (22) Black sea bass (*Centropristis striata*): 11 ½ inches;
- (23) American eel (*Anguilla rostrata*): 6 inches;
- (24) White perch (*Morone americana*): 7 inches.

- (b) No person shall possess in this state any of said species less than the minimum length regardless of where taken. Any of said species taken contrary to this regulation shall, without avoidable injury, be returned immediately to the water from which taken. No person engaged in sport fishing shall possess any summer flounder fillet less than the minimum total length for the species unless the carcass of the fish from which the fillet was removed has been retained and meets the minimum length. This subsection shall not be construed to prevent filleting of fish on shore or at the dockside.

Effective May 19, 1995; amended October 23, 1997, October 30, 1998, December 27, 2000, Adopted as EMERGENCY REGULATION 06/19/2002 to implement 10" minimum length for scup and 11 ½ " minimum length for black sea bass; January 28, 2002; March 31, 2003 Atlantic Cod and Haddock 23", black sea bass 11.5" add white perch 7".

1992

26-159a-7. Creel Limits

- (a) Unless otherwise specified in section 26-112-45 of the Regulations of Connecticut State Agencies, the daily creel limit for species taken by sport fishing methods, including spears of any kind, shall be as set forth in this subsection. No person, other than a person authorized to take finfish under a license or registration issued pursuant to section 26-142a of the Connecticut General Statutes, while on the waters of this state or on any parcel of land, structure, or portion of a roadway abutting tidal waters of this state shall possess any of the following species in excess of the identified number.
- (25) Atlantic cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*): the creel limit shall be the number specified in 50 CFR 648.89 of the Code of Federal Regulations;
 - (26) Black sea bass (*Centropristis striata*): 25 fish.
 - (27) Summer flounder (*Paralichthys dentatus*): 6 fish.
 - (28) American shad (*Alosa sapidissima*) and hickory shad (*Alosa mediocris*): 6 fish of both species in the aggregate.
 - (29) Scup (*Stenotomus chrysops*): 50 fish.
 - (30) American eel (*Anguilla rostrata*): 50 fish.
 - (31) Winter flounder (*Pseudopleuronectes americanus*): 8 fish;
 - (32) Bluefish (*Pomatomus saltatrix*): 10 fish;
 - (33) Alewives and river herring (*Alosa pseudoharengus* and *Alosa aestivalis*): 25 fish of both species in the aggregate;

- (34) Tautog (*Tautoga onitis*): 4 fish;
 - (35) White perch (*Morone americana*): 30 fish;
 - (36) Weakfish (*Cynoscion Regalis*): 10 fish.
- (b) This section shall not be construed to restrict the number of legally acquired fish that may be kept in storage in the home or other storage facilities, or in a commercial storage facility where seafood is handled, stored, processed, or marketed.
 - (c) Any of said species taken contrary to subsection (a) of this section shall, without avoidable injury, be returned immediately to the water from which taken.
 - (d) No person fishing under the provisions of this section or section 26-159a-2 shall also, during the same trip for which the creel limit applies, possess any fish taken under commercial fishery trip limits specified in the Regulations of Connecticut State Agencies.

Effective October 23, 1997, amended October 30, 1998, September 29, 1999, December 27, 2000, January 28, 2002, as EMERGENCY REGULATION 06/19/2002 to implement 50 fish limit for scup and added new subsection (c) regarding release of fish without avoidable injury. March 31, 2003 Atlantic Cod and Haddock as in 50 CFR, Scup to 50 fish, added winter flounder, bluefish(10), alewives and blue backs (25), tautog (4), white perch (30) and weakfish (10) added subsection (d).

APPENDIX D.
COPY OF STATUTE FOR AMERICAN EEL IN EFFECT, STATE OF CONNECTICUT

Sec. 26-128a. Taking of glass eels, elver eels and silver eels prohibited. Penalty. No person shall take or attempt to take any elver eel, glass eel or silver eel from the waters of the state. Any person who violates the provision of the section shall be fined not more that two hundred fifty dollars.

(P.A. 02-50, S. 1.)

New York State Department of Environmental Conservation

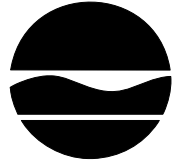
Division of Fish, Wildlife, and Marine Resources

Bureau of Marine Resources

205 North Belle Mead Rd, Suite 1, East Setauket, NY 11733-3400

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Joe Martens
Commissioner

New York Annual State Report on Regulations, Harvest, Bycatch and Fishery-Independent Surveys for American Eel

August 9, 2013

I. Introduction: (*highlight any significant changes in monitoring, regulations or harvest.*)

This report will describe the current regulations, catch, harvest, bycatch, fishery dependent and independent surveys and characterization of other losses for American Eel in New York State for calendar year 2012. This report is necessary for New York State to comply with the Atlantic States Marine Fisheries Commission (ASMFC) Fishery Management Plan (FMP) for American Eel in accord with section 5.1.2 of the FMP as approved April, 2000.

No changes to New York's monitoring program, regulations or management occurred in 2012.

II. Request for *DeMinimis*: - Not Applicable

III. Previous Calendar Year's Fishery and Management Program:

a. Activity and results of fishery dependent monitoring (provide general results and references to technical documentation).

See Section V, Plan Specific Requirements, below.

b. Activity and results of fishery independent monitoring (provide general results and references to technical documentation).

See Section V, Plan Specific Requirements, below.

c. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

1. Current Regulations - Marine District:

Recreational Fishery {6 NYCRR §40.1 (f)}

1. *Open Season:* All year.
2. *Minimum Length:* 6 inches.
3. *Possession limit:* 50

Commercial Fishery {6 NYCRR §40.1 (I)}

1. *Open Season:* All year.
2. *Minimum length:* 6 inches.
3. *Trip limit:* no limit

A license is required to sell any food fish harvested from the marine district of New York, and all such licensed harvesters are required to file fishing vessel trip reports with the NMFS and/or NYS DEC. In addition to these measures, the following special regulations are in effect for commercial eel fishing in the marine district of New York {6 NYCRR §40.1 (p) (1), (2)}:

(1) It shall be unlawful to use eel traps or pots in the waters of the marine and coastal district for commercial purposes with mesh sizes smaller than one inch by one-half inch unless such pots contain an escape panel that is at least four inches square with a mesh size of one inch by one-half inch located so that the panel is on a side, but not at the bottom of the trap or pot.

(2) Any containers, pens or live cars, placed in the waters of the marine and coastal district to store American eels for commercial purposes must be clearly labeled and have visible on the top of such container pen or live car the name and food fish license number of the person responsible for the fish stored within such containers, pens or live cars.

2. Current Regulations - Inland Waters of New York:

Recreational Fishery {6 NYCRR §10.1 (b)(12)}

1. *Open Season:* All year.
2. *Minimum length:* 6 inches.
3. *Daily limit:* 50.

Commercial Fishery {6 NYCRR Parts 35, 36, and 37}

A license is required and a fee is charged per unit of gear to be fished, for any commercial fishing on the inland waters of the State. Inland commercial fishing licenses are not transferable and a report of catch is required at the end of the license period.

In addition to these measures, the following regulations are in effect for commercial fishing for American Eel in the inland waters of New York.

(c) *Eel pots and weirs.*

(1) Size of eel pots. Eel pots shall not be more than six feet long, nor more than 12 inches in diameter if round, nor more than 12 inches square if in square form. The aperture or mouth of any eel pot shall be not more than two inches in its greatest diameter. Fixtures or wings of any kind attached to or used in connection with eel pots is prohibited.

(2) Size of eel weirs. For the purposes of these rules, an eel weir shall consist of not to exceed two wings or leaders fastened to an eel trap; no eel trap shall have attached thereto more than one weir; the length of each weir shall be determined by the department or Chief of the Bureau of Fisheries; and the use of weirs of a greater length than specified in the license is prohibited.

(3) Construction of eel weirs. Eel weirs and eel pots shall not be constructed, set or used in any manner so as to unduly obstruct the natural flow of water or interfere with the free passage of boats. The use of eel weirs, the laths of which are less than three eighths of an inch apart, is prohibited. All fish, except eels, taken in an eel weir or an eel pot, shall be immediately returned to the water.

In addition, the following regulations for specific water bodies also apply;

Section 11.1 (b) The taking, possessing, sale or exposure for sale of American eel from the **Harlem** or **East River** is prohibited, except that American eels may be possessed only when less than 14 inches in length and greater than six inches in length, for use or sale as bait.

(c) American eels unintentionally taken in violation of subdivision (b) of this section must be returned to the water at once without unnecessary injury...;

Section 11.2 (b) In the **Hudson River**, and its tributary waters upstream from the river to the first falls or barrier impassable by fish, from the Federal dam at Troy south to the Battery, New York City, no person may:

(1) take or possess American eel, except when less than 14 inches in length or greater than 6 inches in length, for use as bait or for sale as bait...;

Section 37.1(b) (1) The taking, possessing, sale or exposure for sale of American eel from **Lake Ontario** and the **St. Lawrence River** and their tributaries upstream to the first barrier impassable by fish is prohibited, except that American eels may be possessed only when less than 14 inches in length and greater than 6 inches in length for use as bait or for sale as bait.

(2) American eel unintentionally taken in violation of paragraph (1) of this subdivision must be returned to the water at once without unnecessary injury.

3. Dealer Licensing and Reporting Requirements:

New York Environmental Conservation Law § 13-0334 provides that no person may purchase food fish, whether to be used for food or bait, directly from the person taking such food fish for the purpose of resale trade or barter without a valid food fish and crustacean dealers and shippers license. New York issued 468 dealers and shippers licenses in 2012.

New York regulations in 6 NYCRR § 40.1 (c)(2) requires dealers license holders to file a purchases from fishing vessels report, on a weekly basis, with the NMFS or their designee, for all purchases of marine food fish from harvesters. Additionally, New York regulations in 6 NYCRR § 40.1 (c)(i) require all Marine Commercial food fish license holders to record all species caught on a vessel trip report for each commercial fishing trip they make, and to submit these reports to the DEC.

d. Harvest broken down by commercial (by gear type where available) and recreational, and non-harvest losses (when available).

See Section V, Plan Specific Requirements, below.

e. Review of progress in implementing habitat recommendations.

The New York Power Authority (NYPA) has been actively involved in conducting studies aimed at directing downstream migrants to safe passage around its hydroelectric generating facilities in the upper St. Lawrence River. In addition, NYPA has installed an eel ladder for upstream passage of American eel migrants on the U.S. portion of the Moses-Saunders Hydroelectric Dam. The ladder design includes a pipe/pump system which will safely and effectively pass eels upstream 300 meters beyond the mouth of the dam, to minimize entrainment. NY DEC personnel have been actively involved in the permit review process for both these projects.

In 2006, New York DEC awarded over \$1.8 million dollars in financial aid to municipalities for water quality improvement projects containing upstream passage for American eel. American eel projects include upgrading dams to include fish ladders and improving design of culverts and road beds to improve fish passage. Once completed, these projects will provide access to hundreds of acres of aquatic habitat in the Peconic and South Shore estuaries of Long Island for diadromous fish species.

Three public-private partnership projects have been completed in the past few years. In 2008, a permanent Alaska steep pass fish ladder was installed on the Carmans River, a tributary of Great South Bay, on the south shore of Long Island. In 2010, a rock ramp fish passage was installed in Grangebél Park, on the Peconic River; and a removable video monitoring system was installed during the Spring of 2011. Also in 2011, an Alaska steep pass fish ladder was installed on the western spillway of Massapequa Lake. Though primarily intended for alewife, American eels may be utilizing these fish passages.

IV. Planned Management Programs for the Current Calendar Year.

a. Summarize regulations that will be in effect. (Copy of current regulations if different from IIIc).

See Section III c, above. The NYS DEC anticipates changing regulations for 2014 recreational and commercial American eel fisheries, in compliance with the recently approved ASMFC Addendum III.

b. Summarize monitoring programs that will be performed.

New York will conduct the American Eel juvenile recruitment survey in the Marine District. This survey has been ongoing since 2000 at the same location in the Carman's River, located on the south shore of Long Island. The survey uses a glass eel fyke, and the catch is sampled daily during March and April. The survey and all associated data collection are carried out according to the protocol developed by the ASMFC Technical Committee as approved by the Management Board. Results are attached in Appendix 1.

From 2003 - 2007, New York also sampled glass eels in the Hudson River under a contract with Hudsonia, Ltd., a non-profit institute associated with Bard College in Annandale, NY. Data from these five years of sampling is being examined for comparison to the Marine District site. The survey used the glass eel fyke set at two locations near Wappingers Falls and the Saw Kill River. These locations are approximately 60 and 100 river miles north of the Battery, respectively, near the Southern terminus of Manhattan. Due to funding shortages, New York's contract with Hudsonia has now expired. The NYS DEC is currently in the process of analyzing the data. A preliminary report was included in the 2010 NY American Eel compliance report.

A DEC citizen's science monitoring project is now being conducted along several tributaries of the Hudson River. Project details and results may be viewed at:

http://www.dec.ny.gov/docs/remediation_hudson_pdf/hudsoneelreport.pdf

c. Highlight any changes from the previous year.

No changes from the previous year.

V. Plan Specific Requirements.

1. Commercial Fishery

a. Synopsis of regulations in place

See Section III c, above.

b. Estimates of directed harvest, by month, by region as defined by the states.

1. Pounds landed by life stage and gear type (defined in advance by ASMFC)

The NMFS commercial fisheries website was queried to determine commercial eel landings for New York during 2011. A total of 35,557 pounds of American eels were reported harvested

by commercial fishers during 2011; the tables below provide the landings by gear type and month for 2011. Data for 2012 are not yet available.

Table 1. NMFS New York Landings for American Eel in 2011 by Gear Type.

Year	Species	Gear	Metric Tons	Pounds	\$
2011	EEL, AMERICAN	Not Coded	6.6	14,466	17,901
2011	EEL, AMERICAN	Otter Trawl Bottom, Fish	0.2	512	397
2011	EEL, AMERICAN	Pots And Traps, Eel	0.2	445	891
2011	EEL, AMERICAN	Pots And Traps, Other	8.5	18,669	23,325
2011	EEL, AMERICAN	Lines Hand, Other	0.5	1,184	1,819
GRAND TOTALS:	-		16.0	35,276	44,333

A query from last year revealed an additional 281 pounds of American eel were caught in 2011, by pound net (other) (126 lbs); pots and traps (fish) (136 lbs); pots and traps (lobster, inshore) (16 lbs); and dredge (other) (3 lbs).

Table 2. NMFS New York Landings for American Eel in 2011 by Month.

Year	Month	Species	Metric Tons	Pounds	\$
2011	Jan	EEL, AMERICAN	0.4	835	746
2011	Feb	EEL, AMERICAN	0.1	131	88
2011	Mar	EEL, AMERICAN	0.1	244	145
2011	Apr	EEL, AMERICAN	0.1	174	261
2011	May	EEL, AMERICAN	2.5	5,556	15,742
2011	Jun	EEL, AMERICAN	1.5	3,415	6,308
2011	Jul	EEL, AMERICAN	0.3	695	306
2011	Aug	EEL, AMERICAN	0.4	835	379
2011	Sep	EEL, AMERICAN	1.5	3,239	1,119
2011	Oct	EEL, AMERICAN	3.6	7,914	3,848
2011	Nov	EEL, AMERICAN	2.3	5,171	4,012
2011	Dec	EEL, AMERICAN	3.3	7,348	12,492
GRAND TOTALS:	-	-	16.1	35,557	45,446

Past experience suggests that the NMFS commercial landings data underestimates the actual landings in New York. Mandatory reporting is required for all harvesters and dealers of food fish as provided above. Improvements in reporting proposed by the ACCSP should achieve a higher level of legitimacy of reported landings compared to the actual landings. These improvements were expected after calendar year 2003, given the lag in availability of landings data coupled with the fact that New York has only recently introduced mandatory reporting for commercial food fish, baitfish, and dealer license holders. An increase in reported landings suggests that more harvesters and dealers are complying with the reporting requirements.

2. Biological data taken from representative subsamples to include sex ratio and age structure (for yellow/silver eels), length and weight if available.

No biological monitoring of the commercial eel fishery was performed during calendar year 2012. In order to conduct the biological monitoring required in the Plan, New York will need to address staffing and funding needs associated with such requirements. It is anticipated that, at a minimum, two additional staff will need to be added to the Diadromous Fish Investigations Unit, and that several thousand dollars of costs will be incurred in association with the purchase and processing of commercial monitoring samples. Unless and until these needs are addressed, it is unlikely that biological monitoring of the commercial eel fishery in New York will occur.

3. Estimated percent of harvest going to food versus bait.

No information exists from commercial reporting mechanisms to address the proportion of harvest going to food or bait. Mandatory reporting, combined with improvements proposed by the ACCSP should address these issues.

c. Estimates of export by season (provided by dealers).

Total United States 2011 Annual Landings for American Eel were 1,168,727 pounds, for a total value of \$9,112,400 (\$7.80/lb). The NMFS Fisheries Statistics and Economics website was queried to determine eel exports during 2011. Total 2011 United States exports of fresh and frozen eel (unspecified species) were 1,282,259 kilos worth \$2,201,079 dollars (U.S.). The 2011 exports decreased from the 2010 export totals by 659,599 kilos and \$1,431,195, respectively. Eel export data, while highly variable, has generally shown a steep decline since 2003 (3,308,982 kilos). Eel imports have generally shown a yearly increase since 1996, when 391,690 kilos were imported to the United States, compared to 2011, when 486,274 kilos of eel were imported.

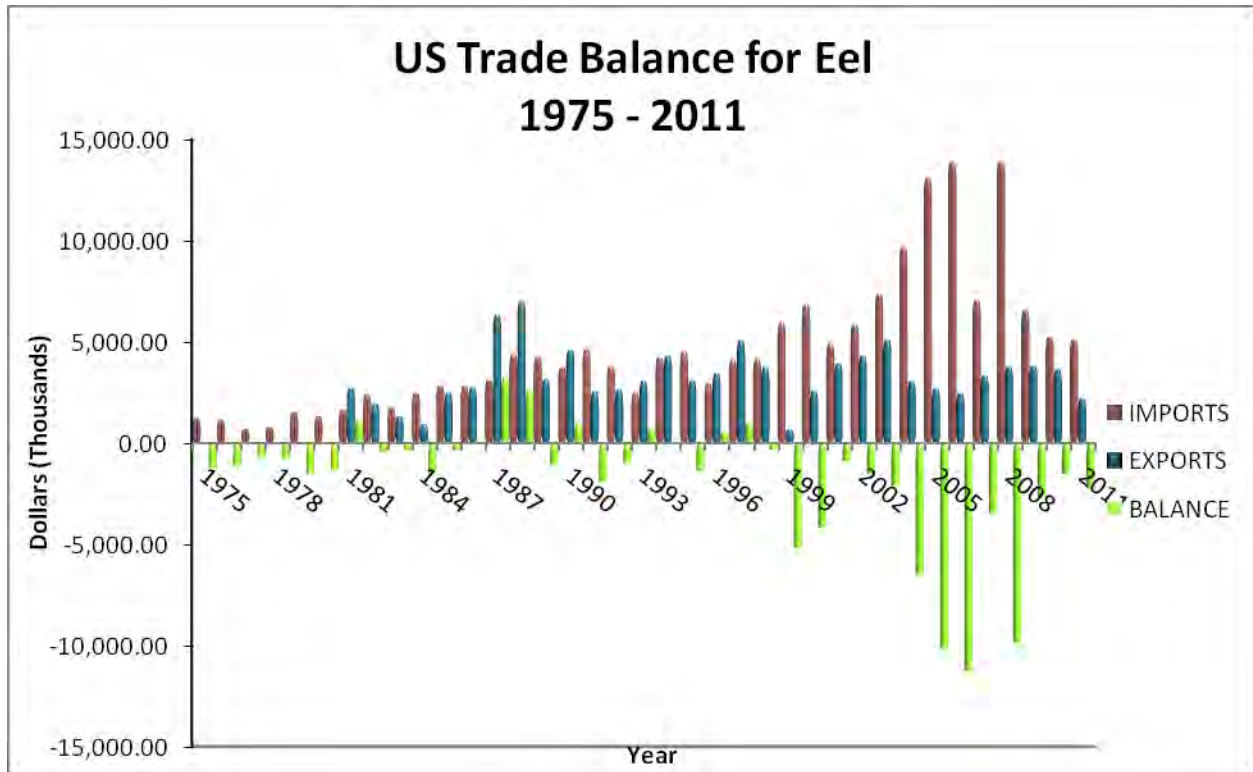
Exports of fresh eels in 2011 totaled 7,954 kilos. 1,624 kilos of fresh eels were exported to Canada; 230 kilos were exported to Costa Rica; 100 kilos were exported to Guatemala; and 6,000 kilos were exported to Portugal. Total fresh eel exports from the United States showed a decrease in 2011, compared to the 29,783 kilos destined for export to South Korea, Portugal, and Canada in 2010.

Exports of frozen eel totaled 1,274,305 kilos in 2011, and were distributed to a variety of destinations. The bulk of the 2011 frozen eel export was primarily to South Korea (827,555 kilos), and was lower than in 2010 (1,500,066 kilos). In addition, frozen eel was exported to Bermuda (3,889 kilos), Brazil (37,175 kilos), Canada (1,106 kilos), China (1,000 kilos), Hong Kong (87,320 kilos), Curaco (7,923 kilos), Dominican Republic (8,052 kilos), Guatemala (5,960 kilos), Honduras (16,059 kilos), Jamaica (8,910 kilos), Japan (17,990 kilos), Netherlands Antilles (3,268 kilos), Portugal (39,555 kilos), Saint Maarten (3,268 kilos), Trinidad and Tobago (4,676 kilos), and Venezuela (200,599 kilos).

Figure 1. United States Imports and Exports of Eels. 1975 – 2011



Figure 2. United States Trade Balance for Eels 1975 – 2011



Of interest is the United States trade balance in eel. Since 1975, the U.S. imports of eel exceeded exports and re-exports, resulting in an average trade deficit of -\$1,917,079. The trade deficit was -\$2,226,365 in 2011.

It is worth noting that during 2011, the most recent year where statistics exist for both eel exports and total U.S. commercial landings, exports of fresh and frozen eel (1,282,259 kilos) were approximately two and one half times the U.S. commercial landings (530,100 kilos) suggesting either a lag between harvest and export, under-reporting of commercial landings, or a misidentification of the species being exported.

A NMFS trade query for 2012 indicates that carp, catfish, eels, Nile perch, snakehead, and tilapia products were all included in the latest eel product category, with much higher 2012 balance of trade (-\$55,947,278), compared to 2011 (-\$2,226,365). Clearly, the FMP requirement to report American Eel exports by State and season will not be addressed by conventional means. These needs should be re-assessed by the eel technical committee, and alternative solutions should be proposed.

d. Harvest data provided as CPUE (by life stage and gear type).

No information exists from existing commercial reporting mechanisms to address the requirement to report harvest data as CPUE by life stage and gear type. Mandatory reporting, combined with improvements proposed by the ACCSP should address these issues.

e. Permitted catch for personal use, if available.

No information is available on the amount of catch for personal use.

2. Recreational fishery

a. Synopsis of regulations in place.

See Section III c, above.

b. Estimate of recreational harvest by season (if available).

The NMFS Marine Recreational Fisheries Survey website (MRIP Catch Snapshot) was queried to determine eel landings by recreational fishers in New York during 2012. A query of the annual New York catches for all fishing modes and areas revealed that 66 (PSE=99.5) eels were caught (Type A+B1+B2) by recreational anglers in New York. From the query results, all these eels were released alive (B2) (PSE=99.5). All 66 eels were caught during Wave 6 (November – December).

1. Biological data taken from representative sub-samples to include sex ratio, age structure, length and weight (if available).

No surveys of recreational anglers were conducted to obtain biological data for American Eel in New York during 2012. In order for these needs to be addressed in the future, New York will need to add staffing and resources in addition to those discussed under the section of this report concerning biological monitoring for commercial fisheries.

3. Fishery independent monitoring

a. Results of the Annual Young-of-Year Abundance Survey (unless exempt).

See Appendix I, which is attached.

b. Description of other fishery-independent surveys performed (methods, location, etc.) and results (if required in FMP).

No other initiatives for American Eel research and monitoring are planned for New York.

c. Projects planned for next five years.

No other initiatives for American Eel research and monitoring are planned for New York. The Hudson River Striped Bass and Alosine surveys, and the Western Long Island Seine Survey, are ongoing. Although they primarily target other species, NY will continue to collect information on American eels caught in these surveys as bycatch.

4. Characterization of Other Losses.

To the extent possible states/jurisdictions should attempt to characterize the losses of American eel, in number and weight by life stage or age, due to factors other than commercial and recreational fisheries. Such losses may include, but are not limited to the following:

- a. Impingement/entrainment mortalities of eel at power generation facilities, water intakes, and navigation locks.
- b. Bycatch mortalities in commercial and recreational fisheries.
- c. Confiscated poundage from illegal or undocumented fisheries (i.e., poaching)
- d. Scientific losses (i.e., samples collected for contaminants analyses, other studies)
- e. Mass mortalities of eel due to disease, spills or other causes.

No mechanism exists whereby one could readily obtain data regarding these issues. It is suggested that the American Eel technical committee address these needs at the stock level, as part of an overall assessment, and identify general methods to address these issues.

Appendix I

New York's Annual Glass Eel Abundance Survey

Introduction:

Beginning in 2000, New York initiated an annual survey to investigate glass eel abundance and recruitment, as required by the American Eel FMP. The glass eel fyke was selected as the preferred survey gear, and was deployed in a small river located off the south shore of Long Island. The survey site is in the tidal portion of the Carman's River, which flows south for 17.7 kilometers through the Wertheim National Wildlife Refuge into Bellport Bay (Figure 4). The watershed area is 182 square kilometers. The tidal portion of the river is 5.8 kilometers (NYSDEC 1995). The survey site is ideally suited to catch eels migrating upstream because it is located at a constriction in the river which the eels must pass through to reach freshwater habitat. This report will describe the methods and results for the annual survey from 2000 through present.

Methods:

The glass eel fyke is constructed of two wings of equal length attached to a tapered section which includes a single funnel. The entire length across the wings is thirty feet by eight feet deep. A line of seine floats is strung across the top of the fyke to keep it upright in the water column. A chain line holds the bottom down against the current. The net is set so that eels swimming upstream enter into the tapered section and are trapped after passing through the funnel section into the hold.

The fyke was checked daily over an eight week period during early Spring (Table 1). The survey typically occurs over a six week period, but has been extended to account for variability in the timing of arrival, and recruitment of glass eels to the Carman's river site. Each catch was sorted and enumerated by species. Glass eels were easily distinguishable from pigmented elvers, and each was recorded separately. Environmental and climatological data were also recorded for each catch. These included water and air temperature, tide stage, time of the previous high tide, and the amount of the previous day's precipitation. In addition the elapsed time between checks of the net, and the condition of the gear upon arrival to the survey site were also recorded. The catch of eels was released upriver, above a dam separating the tidal and non-tidal portions of the river so as not to affect estimates of annual recruitment.

American eels collected for bio-characteristic sampling were returned to the laboratory where they were anesthetized using 4-6 drops of a 10% solution of clove oil in ethanol, per 500 milliliters of river water. This procedure sedated the eels, permitting ease of handling, yet did not euthanize the eels. After measuring and weighing, the glass eels were kept moist on paper towels during the determination of pigmentation stage, then placed in a bucket of aerated river water. Approximately 90% of the eels anesthetized in this manner recovered in the aerated water, and were returned to the release site in the Carman's River. Length measurements were made to the nearest 0.1 millimeter using a Mitutoyo digital caliper (Model 700-113 "MyCal Lite"). Eels were weighed to the nearest 0.001 gram on a Sartorius electronic digital laboratory balance. Pigmentation stage was determined by methods described in Haro, A.J., and W.H. Krueger, 1988. Glass eels were examined under binocular dissecting microscopes independently by two individuals, and the stage assignments compared for agreement. Disagreements were resolved through group examination.

Results:

Table 1 provides the total catch of glass eels and pigmented elvers for the 2000 through 2013 survey seasons. Included are mean water temperatures associated with each year's catch. A total of 2,607 glass eels were caught during 2013. Seven hundred thirty (28%) of the 2013 glass eels were caught during the first week of sampling (Feb 27 – March 5, Figure 1). 592 of these were caught during the second day of sampling. Total catch of glass eels has varied over time with the highest catch (13,491) occurring during 2002. The total catch of pigmented elvers was 124 during 2013. The highest catch of pigmented elvers (840) occurred in 2009.

Table 2A provides that the geometric mean catch of glass eels was 1.29 eels per hour fished during 2013. This was the second highest GM CPUE since the inception of this study. The highest rate was 1.89 glass eels/hour fished, in 2002 (Table 2). Figures 2 and 3 show GM CPUE, with 95% confidence intervals, for glass eels and pigmented elvers, respectively, during the 2000-2013 surveys.

Precipitation recorded at a nearby weather station indicates that rainfall amounts during the survey were lowest during 2002, 2009, 2011, 2012, and 2013, suggesting that higher salinities in the estuary made finding the freshwater input, and hence our trap, easier for eels swimming upriver. More eels were caught during the three days prior to a full moon (i.e., waxing gibbous), than were caught during the three days after a full moon (i.e., waning gibbous), suggesting further study.

During the 2013 survey 1,327 glass eels and 90 pigmented elvers were sampled for length and weight. The mean length of the glass eels measured was 59.4 millimeters (mm). The smallest and largest glass eels measured were 46.7 mm and 70.2 mm, respectively. The range of dominant size groups (i.e., those contributing 6% or more to the sample distribution) was from 52 mm to 66 mm (Table 4). Since 2002, a total of 7,619 glass eels have been collected for measurement. Approximately 95% of these have been within a range 52 mm to 66 mm total length.

The mean length of the 90 pigmented eels measured in 2013 was 85.5 millimeters (mm). The smallest and largest pigmented eels measured were 61.6 mm and 139.6 mm, respectively.

During 2013, the mean weight of glass eels sampled was 0.169 grams (gm). Weight of individual glass eels ranged from 0.056 gm to 0.307 gm. The range of dominant weight groups (i.e., those contributing 6% or more to the sample distribution) was from 0.10 gm to 0.249 gm (Table 5).

The mean weight of the pigmented eels sampled was 0.780 grams (gm). The weight of individual pigmented eels ranged from 0.237 gm to 2.962 gm.

Table 9 provides weight-length parameters for the linear and non-linear fit of weight at length for pigmented eels. The 2013 equation is:

$$\text{Weight (gms)} = 8.85\text{E-}07 * L \text{ (mm)} ^{3.055}$$

Pigmentation of glass eels was determined using methods provided in Haro and Krueger (1988). Weekly pigmentation staging suggests a gradual progression from stages 1-2 in the early part of the survey to stages 6-7 near the end of sampling. During 2013, ninety-four percent of the glass eels examined for pigmentation stage were graded stage 1- 5 with the majority (26%) graded stage #2 (Table 6).

Table 1. Total catch of glass eels and pigmented elvers during the 2000 through 2013 abundance surveys.

Year	Sampling Dates	# Observations	# Glass Eels	# Elvers	Mean Water Temperature (° C)	Mean Precipitation (in)
2000	March 8 - April 20	44	1,877	316	10.44	0.14
2001	Feb 15 - April 20	44	356	161	9.39	0.24
2002	Feb 28 - April 19	51	13,491	459	9.73	0.10
2003	Feb 27 - May 2	65	507	45	9.64	0.14
2004	Feb 27 - April 30	59	1,492	265	10.3	0.16
2005	March 1 - April 29	60	1,131	199	10.3	0.13
2006	March 1 - May 1	62	684	322	11.5	0.13
2007	March 1 - May 4	56	863	514	10.5	0.16
2008	Feb 29 - April 15	47	742	440	9.56	0.16
2009	March 6 - April 20	46	874	840	9.69	0.10
2010	March 3 - April 22	51	407	309	11.83	0.20
2011	Feb 23 - April 21	57	959	229	9.82	0.10
2012	Feb 28 - April 25	57	2,268	119	12.77	0.08
2013	Feb 27 - April 26	59	2,607	124	9.99	0.10

Table 2. Bootstrap geometric mean catch per hour fished for glass eels during the 2000 through 2007 abundance surveys (boot N = 500).

Year	Geometric Mean	variance	Lclm	Uclm
2000	0.76	0.01	0.56	0.98
2001	0.24	0.01	0.17	0.32
2002	1.89	0.02	1.59	2.2
2003	0.22	0.01	0.13	0.34
2004	0.45	0.01	0.31	0.60
2005	0.44	0.01	0.33	0.58
2006	0.31	0.01	0.22	0.41
2007	0.36	0.01	0.25	0.51

Table 2A . Geometric Mean catch per hour fished for glass eels during 2008 through 2013.

Year	Geometric Mean	Variance	Lclm	Uclm
2008	0.44	0.09	0.27	0.64
2009	0.62	0.09	0.43	0.84
2010	0.28	0.03	0.20	0.38
2011	0.52	0.11	0.47	0.57
2012	1.24	0.17	0.92	1.61
2013	1.29	0.15	0.98	1.64

Table 3. Bootstrap geometric mean catch per hour fished for pigmented eels during the 2000 through 2007 abundance surveys (boot N = 500).

Year	Geometric Mean	Variance	Lclm	Uclm
2000	0.50	0.01	0.41	0.61
2001	0.19	0.01	0.13	0.25
2002	0.99	0.01	0.88	1.1
2003	0.17	0.01	0.10	0.24
2004	0.31	0.01	0.21	0.39
2005	0.32	0.01	0.24	0.40
2006	0.23	0.01	0.18	0.30
2007	0.26	0.01	0.19	0.33

Table 3A. Geometric Mean catch per hour fished for pigmented eels during 2008 through 2013.

Year	Geometric Mean	Variance	Lclm	Uclm
2008	0.35	0.03	0.25	0.45
2009	0.65	0.07	0.47	0.84
2010	0.21	0.01	0.14	0.29
2011	0.17	0.01	0.14	0.19
2012	0.08	0.004	0.06	0.11
2013	0.08	0.004	0.06	0.11

Table 4. Length frequency distributions for glass eels captured during the 2002 - 2012 abundance surveys.

Length (mm)	YEAR													Sum	Percent
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013			
<46											1		1	0.01	
46 - 47.9											1	1	2	0.03	
48 - 49.9	1	0	1	0	1	0	0	3	2	1	5	11	25	0.33	
50 - 51.9	5	0	4	4	5	0	1	5	7	6	26	37	100	1.31	
52 - 53.9	17	3	8	12	28	10	6	27	20	19	112	85	347	4.55	
54 - 55.9	53	9	34	46	86	41	30	65	61	67	315	137	944	12.39	
56 - 57.9	144	27	72	82	88	109	55	131	72	139	367	193	1,479	19.41	
58 - 59.9	218	28	107	73	94	137	95	149	86	158	306	258	1,709	22.43	
60 - 61.9	219	42	100	62	52	134	73	130	45	160	188	238	1,443	18.94	
62 - 63.9	191	31	61	24	23	55	62	51	20	83	86	191	878	11.52	
64 - 65.9	127	30	32	14	5	16	32	13	9	43	17	111	449	5.89	
66 - 67.9	67	9	13	5	1	5	11	3	1	5	6	51	177	2.32	
68 - 69.9	26	1	4	1	0	0	3	2	1	2	1	11	52	0.68	
70 - 71.9	3	2	1	0	0	0	1	0	0	0	0	3	10	0.13	
72 - 73.9	0	0	1	0	0	1	0	0	0	0	0		2	0.03	
74 - 75.9	1	0	0	0	0	0	0	0	0	0	0		1	0.01	
Total	1,072	182	438	323	383	508	369	579	324	683	1,431	1,327	7,619	100.00	

Table 5. Weight frequency distributions for glass eels captured during the 2002 - 2013 abundance surveys.

Weight (gm)	YEAR 2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Sum	Percent
0.00-0.05												3	3	0.04
0.075 - 0.99	6		4	2			1	1	2	6	14	45	81	1.06
0.1 - 0.124	55	5	14	39	42	34	20	16	20	62	183	135	625	8.21
0.125 - 0.149	197	27	63	109	123	121	62	93	71	121	501	243	1,731	22.73
0.15 - 0.174	319	50	134	89	121	193	101	181	111	171	453	316	2,239	29.40
0.175 - 0.199	253	41	122	54	73	108	102	167	73	139	202	283	1,617	21.23
0.2 - 0.224	143	33	55	24	17	38	51	78	36	54	62	189	780	10.24
0.225 - 0.249	62	20	31	4	4	10	27	37	5	41	13	84	338	4.44
0.25 - 0.274	29	3	7	1	3	3	3	3	1	29	2	21	105	1.38
0.275 - 0.299	6	2	4					2	2	17		6	39	0.51
0.3 - 0.324	1	1	3			1	1		2	6		2	17	0.22
0.325 - 0.349								1		4			5	0.07
0.35 - 0.374	1								1	4			6	0.08
0.375 - 0.399			1							7			8	0.11
0.4 - 0.424										7			7	0.09
0.425 - 0.449										2			2	0.03
0.45 - 0.474										6			6	0.08
0.475 - 0.499										6			6	0.08
0.5 - 0.524										1			1	0.01
Total	1,072	182	438	322	383	508	368	579	324	683	1,430	1,327	7,616	100.00

One glass eel from each of the 2005, 2008, and 2012 surveys were not weighed.

Table 6. American Eel juvenile survey glass eel pigmentation stage frequencies. Pigmentation stages based on Haro and Krueger (1988) Can. J. Zool. 66:2528 - 2533.

Stage	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Sum	Percent
1	21	6	42	51	4	16	3	10	21	28	22	169	393	5.20
2	320	11	93	133	49	37	16	76	47	112	155	355	1,404	18.56
3	432	33	113	80	67	77	50	173	64	141	208	305	1,743	23.05
4	234	90	105	38	109	102	98	154	87	164	325	249	1,755	23.21
5	60	36	41	15	106	105	102	127	59	143	299	165	1,258	16.63
6	5	5	11	6	38	139	87	36	20	72	268	76	763	10.09
7	0	0	0	0	10	32	13	3	10	22	150	7	247	3.27
Total	1,072	181	405	323	383	508	369	579	308	682	1,427	1,326	7,563	100.00

Table 7. Length frequency distributions for pigmented eels captured during the 2002 - 2013 abundance surveys.

Length (mm)	YEAR												Sum	Percent
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
50 - 59.9	0	0	2	0	1	2	0	0	0	0	0	0	5	0.20
60 - 69.9	25	2	12	4	15	20	13	5	12	3	5	3	119	4.78
70 - 79.9	146	6	39	44	76	82	105	114	54	53	24	35	778	31.22
80 - 89.9	69	5	95	32	55	103	98	259	42	58	23	34	873	35.03
90 - 99.9	19	5	56	8	26	39	36	114	32	21	12	6	374	15.01
100 - 109.9	8	2	15	11	6	22	24	27	27	15	6	4	167	6.70
110 - 119.9	12	4	7	4	5	14	13	14	6	3	9	1	92	3.69
120 - 129.9	5	3	3	0	3	5	2	3	9	5	3	6	47	1.89
130 - 139.9	6	0	1	1	0	3	3	3	6	2	1	1	27	1.08
140 - 149.9	1	2	1	0	1	2	0	0	0	2	0	0	9	0.36
150 - 159.9	0	0	0	0	0	0	0	0	0	1	0	0	1	0.04
Total	291	29	231	104	188	292	294	539	188	163	83	90	2,492	100.00

Table 8. Weight frequency distributions for pigmented eels captured during the 2002 - 2013 abundance surveys.

Weight (gm)	YEAR													Sum	Percent
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013			
0.0 - 0.49	150	8	53	43	66	106	90	96	57	38	18	28	753	30.22	
0.5 - 0.99	101	10	136	42	101	134	143	381	66	90	39	47	1290	51.77	
1.0 - 1.49	18	1	30	15	13	29	38	40	39	24	15	7	269	10.79	
1.5 - 1.99	11	6	5	3	4	13	13	15	11	3	5	3	92	3.69	
2.0 - 2.49	3	2	5	1	1	5	7	4	11	4	4	3	50	2.01	
2.5 - 2.99	4	1	1		2		1	2	4	1	1	2	19	0.76	
3.0 - 3.49	3	1			1	3	2				1		11	0.44	
3.5 - 3.99			1			1		1		2			5	0.20	
4.0 - 4.49	1					1				1			3	0.12	
Total	291	29	231	104	188	292	294	539	188	163	83	90	2492	100.00	

Table 9. Weight - Length regression parameters for pigmented eels from the NY glass eel survey for 2002 – 2013, where $W(\text{gms}) = a * L(\text{mm})^b$.

Year	a' (Ln(a))	a	b	N
2002	-14.82476	3.64E-07	3.23857	291
2003	-14.54055	4.84E-07	3.1667	29
2004	-15.34972	2.16E-07	3.34964	231
2005	-14.32373	6.02E-07	3.12349	104
2006	-13.7355	1.08E-06	3.00106	188
2007	-15.29564	2.28E-07	3.33069	292
2002 - 2007	-14.72346	4.03E-07	3.21194	1135
2008	-14.9394	3.26E-07	3.274	294
2009	-14.8388	3.59E-07	3.244	539
2010	-13.7686	1.048E-06	3.017	183
2011	-14.2247	6.642E-07	3.113	163
2012	-15.2518	2.378E-07	3.348	83
2013	-13.9378	8.849E-07	3.055	90

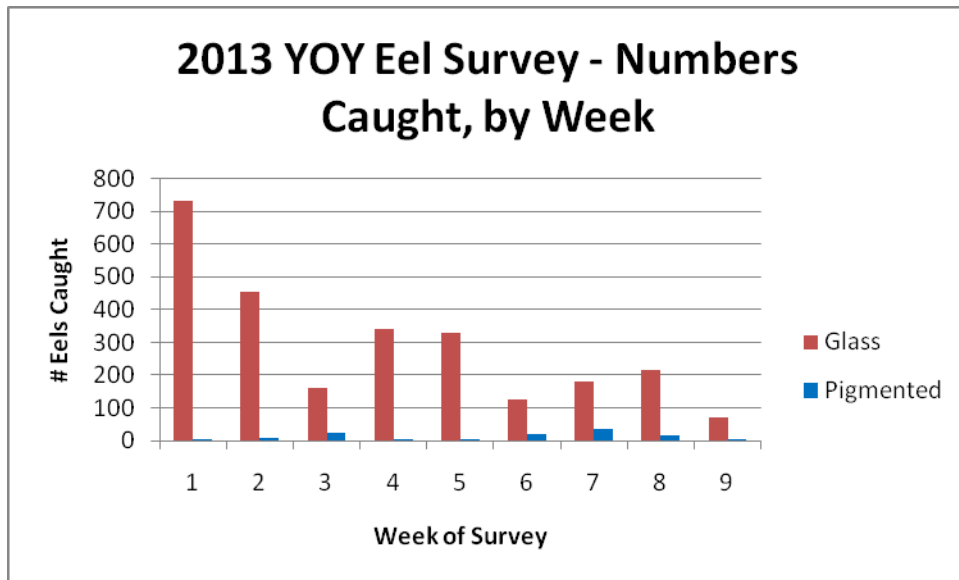


Figure 1. Number of eels caught per week of survey. Survey ran from Feb 26 through April 26, 2013. Full moon occurred on Feb 25 (Week 1), March 27 (week 5), and April 25 (Week 9). Survey ended 3 days after the start of week 9. New moon occurred March 11 (Week 2) And April 10 (Week 7).

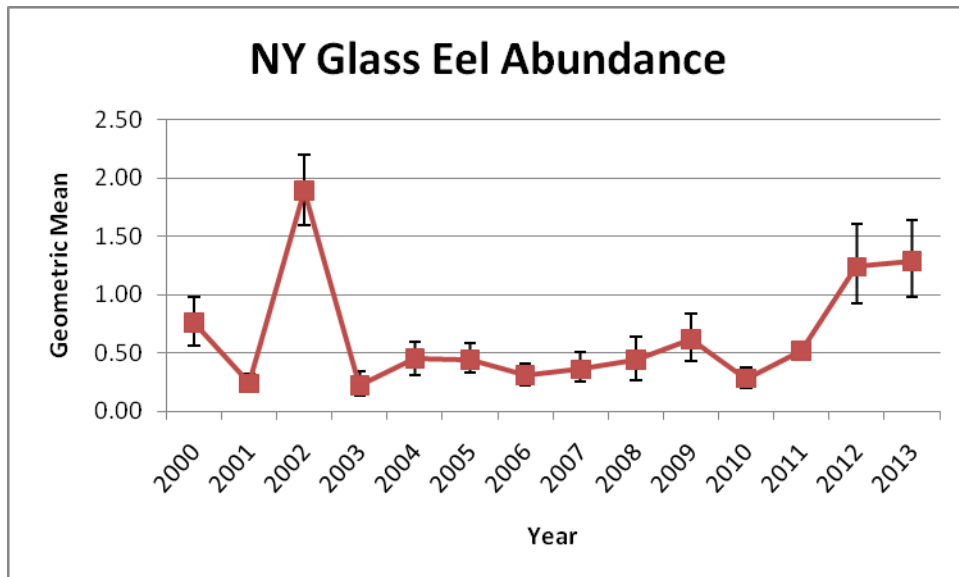


Figure 2. Glass Eel Abundance (Geometric Mean catch per hour, with 95% confidence intervals) from 2000-2013 Annual Surveys.

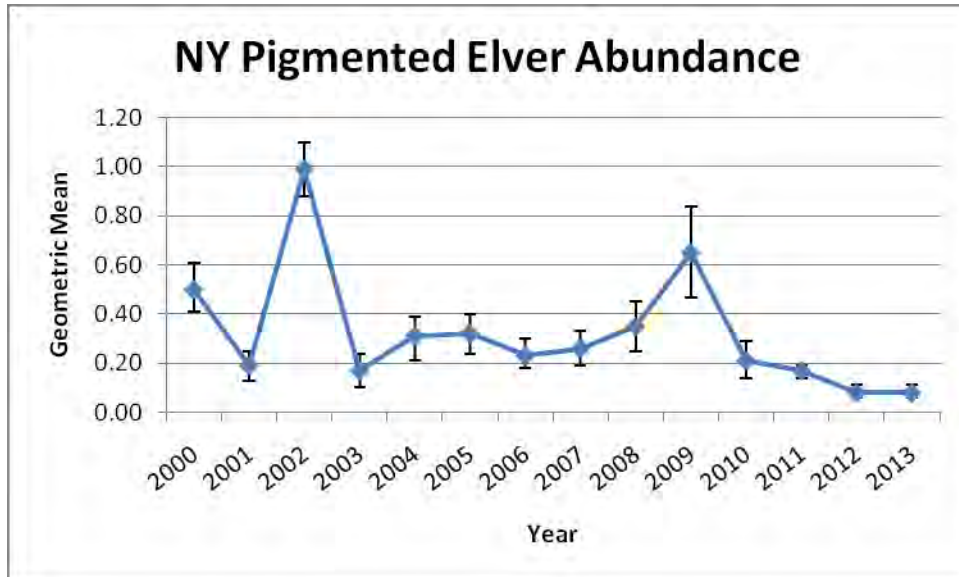


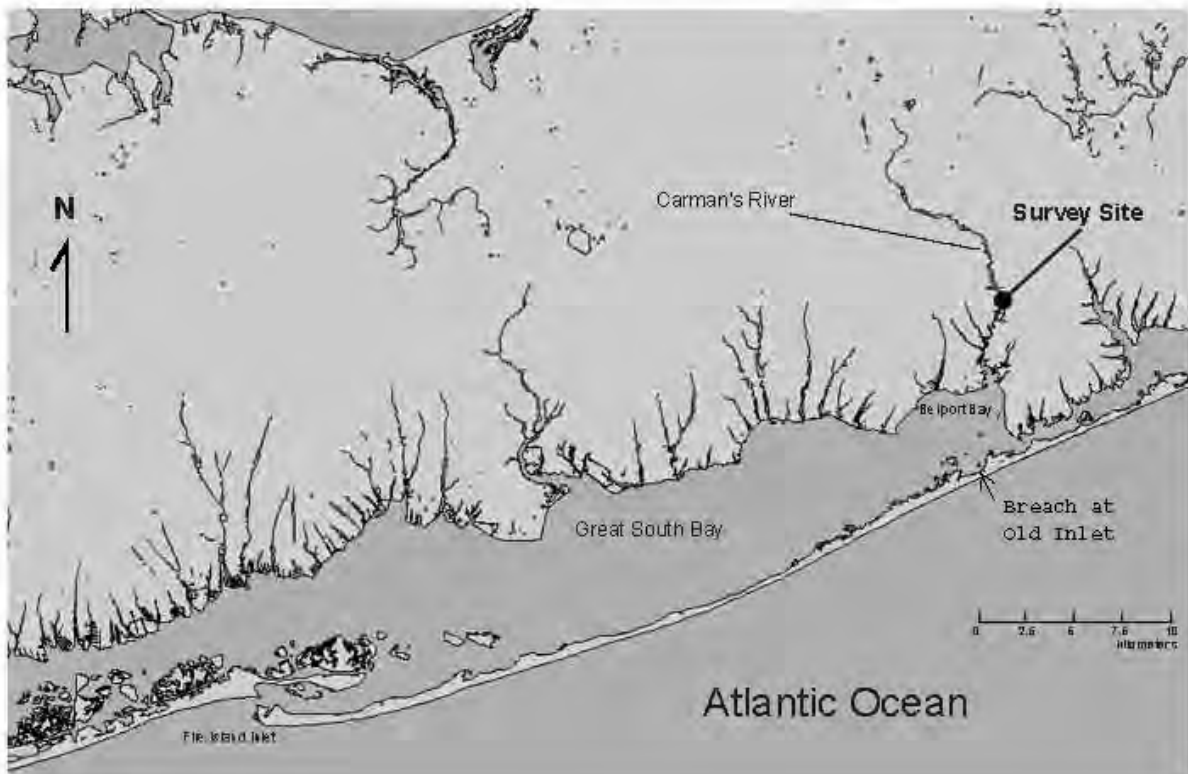
Figure 3. Pigmented elver abundance (Geometric Mean catch per hour, with 95% confidence intervals) from 2000 -2013 Annual Surveys.

Table 10 lists other fish species caught in the fyke net for the 2000 – 2013 survey seasons. In 2013, we also caught the cumacean, *Pseudoleptocuma minor*; and the small hydromedusa, *Sarsia tubulosa*. These species have not been recorded during the previous twelve years of this survey. It should be noted that a breach was formed near Old Inlet on the barrier island (Figure 4) in late October 2012, due to Super Storm Sandy. We will continue to monitor and record all species caught in our future surveys.

Table 10. Other fish species caught in NY annual glass eel abundance survey.

Common_name	COUNT	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
NORTHERN PIPEFISH	4														4
SUMMER FLOUNDER	14														14
FOURSPINE STICKLEBACK	2,916	141	271	159		77	84	19	62	16	286	1,371	272	55	103
KILLIFISH SPP.	188		81	14		46	29		1		1	3		1	12
NINESPINE STICKLEBACK	30		4	22			2							1	1
CHAIN PICKEREL	1													1	
GOLDEN SHINER	1								1						
GRASS PICKEREL	1											1			
PUMPKINSEED	3								3						
REDFIN PICKEREL	5			3		1			1						
SMALLMOUTH BASS	1	1													
Unident. Shiner Spp	1														1
TESSELLATED DARTER	49		4			10	8			1	3	12	9	2	
TOTAL	3,214	142	360	198	0	134	123	19	68	17	290	1,387	281	60	135

Figure 4: Central Long Island showing the American Eel YOY Survey site, Carman's River, Great South Bay, Fire Island Inlet and the Atlantic Ocean.



Acknowledgments:

We thank the staff of the Wertheim National Wildlife Refuge for their continued support of this project, and permission to access the refuge.

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**NEW JERSEY DEPARTMENT OF
ENVIRONMENTAL PROTECTION**

**DIVISION OF FISH AND WILDLIFE
MARINE FISHERIES ADMINISTRATION
BUREAU OF MARINE FISHERIES**

NEW JERSEY AMERICAN EEL FISHERIES: 2012

**2012 Commercial and Recreational Fisheries and
Fishery Independent Monitoring, and 2013
Management and Monitoring Program**

Report By: Jennifer Pyle

**Submitted to the Atlantic States Marine Fisheries
Commission as a requirement to the Interstate Fisheries
Management Plan For American Eel
August 2013**



1. Commercial Fishery 2012

a. Regulations

- 6" minimum size limit
- Season: January 1 - December 31
- Pot diameter not to exceed 16 inches if cylindrical or 201 square inches in cross section if any other configuration
- Mesh no smaller than 3/16 inch bar inside measurement
- Fee: \$100
- Use of two pots is permitted for taking killifish or eels for bait, without a license, provided they are not sold or used for barter
- Mandatory daily trip level and dealer transaction reporting is planned for the next five years. Miniature fyke net (eel pot) license holders are required to report monthly for each month that they possess a license, from January 1 to December 31. See Figures 1 and 2 for samples of reporting forms. All required reports must be filed before a license is issued for the subsequent year.

b. Harvest

1. Pounds landed by life stage and gear type

Reported 2012 landings from New Jersey's commercial reporting forms totaled 105,913 pounds of American eel (Figure 3). Reported landings from the NMFS Commercial Fisheries Database were not available. All harvest caught using pots are assumed to be yellow eels. New Jersey landings decreased in 2012 by almost 15,000 pounds. See Table 1 for a comparison of the NMFS landings versus NJ landings.

2. Biological data

During 2012, biological samples were collected from the commercial fishery. Length, weight and age samples were taken from 140 yellow eels in 2012. The mean length of all samples was 16.12 inches, while the mean weight of all samples was 0.314 pounds (Table 2). All samples were collected in the Delaware Bay.

Of the 140 age samples collected, all otoliths were successfully processed for ageing. Age and age-length data will be included in the next compliance report.

3. Estimated percent of harvest going to food versus bait

The majority of eels (84.24%) were commercially harvested as food, followed by bait (12.70%) and personal use (0.21%) according to reporting forms provided by New Jersey's commercial fishermen. Disposition was unknown for 3,014 pounds (2.85%) of American eel. See Table 3 for reported disposition.

c. Export Estimates (from dealers)

There is only one known export dealer for New Jersey eels, so these data are confidential. Data can be provided upon request from anyone with confidential access to NJ data.

d. Harvest CPUE

Estimated harvest catch per unit effort for 2012 was 178.91. This is lower than the time series average of 206.73 and the 2011 CPUE of 210.06 (Figure 4). It should be noted that this may be an overestimate since there were very few trips reported with a negative catch. It is possible that the fishermen do not completely understand that daily catch must be reported, even if it is negative. Clarification of the reporting form instructions may be necessary.

2. Recreational Fishery 2012

a. Regulations

- 6" minimum size limit
- Season: January 1 - December 31
- Harvest and possession limit of 50 eels per person

b. Harvest

Unknown

3. Fishery Independent Monitoring Program 2012

a. Young-of-Year Abundance Survey

Glass eels were collected with a modified Japanese elver fyke net during a nine-week period from February 1 through April 5. The net was tended daily during daylight at low tide, when possible, 31 times. Sampling for glass eels was conducted in Patcong Creek in Linwood, New Jersey (Atlantic County) N 39°21.667', W 74°34.618'. The net was set under the Route 661 bridge, downstream of a spillway that Bargaintown Pond flows over. Patcong Creek is freshwater and tidal. It flows into the Great Egg Harbor, Great Egg Inlet and finally to the Atlantic Ocean.

Each day's catch was weighed and counted or sub-sampled if large. The geometric mean catch per unit effort was 1,589.8, which is significantly higher than the time series average of 83.8 (Figure 5). An estimated 100,350 glass eels were taken from the fyke net during the sampling period. The 2012 catch was higher than the previous 2006 record year and ranked first in the thirteen year time series.

Glass eels were individually measured using a Mitutoyo Absolute Digimatic Caliper and weighed using an Acculab digital scale several times a week for size frequency distribution. In 2012, 1,340 glass eels were individually measured. Lengths ranged from 46.92 millimeters to 69.84 mm with a mean of 57.61 mm. Weights ranged from 0.074 grams to 0.298 grams with a mean of 0.165 grams.

During the winter of 2011, alternative eel collectors were created by attaching frayed polypropylene rope to a PVC planter base with cable ties. Each collector was weighed down by attaching a terracotta base to the bottom of the PVC planter. These collectors were "seasoned" in saltwater for 2 months in order eliminate any artificial odor and to allow algae, fish and other species to utilize them as a temporary habitat.

Four (4) collectors were created, and three were used in addition to the fyke net during the 2012 sampling season. Two were used at the Patcong Creek location near, but not impeding, the fyke net, while one was set in Nacote Creek, Port Republic, New

Jersey (Atlantic County). Nacote Creek is freshwater and tidal. It flows into the Mullica River, Great Bay, Little Egg Inlet and finally to the Atlantic Ocean. On average, each gear was tended 4 times per week during this period.

The total number of eels collected using all collection methods was 292,980 eels. The majority of the total (42.4%) were caught in one of the new collectors, located near the fyke net (Table 4). Figure 6 shows the number of eels caught in each gear type on a weekly basis.

b. Other fishery-independent surveys

In an attempt to verify year class strength, the New Jersey Bureau of Marine Fisheries has been investigating methods to collect yellow eels in the impoundment above the glass eel collection site. The electroshocking survey conducted in 2008 and 2009 has not been repeated, and there are no plans to conduct this type of sampling at this site again.

c. Projects planned for next five years

All projects conducted in 2012 will continue for the next five years.

4. Characterization of Other Losses

a. Impingement and entrainment

Estimates from 1995-2012 were recently obtained from Public Service Enterprise Group's (PSE&G) annual report of biological monitoring at the Salem Generating Station. Data from the last five years is shown in Tables 5 and 6.

b. Poaching

During 2012, Marine Fisheries staff was not notified of any enforcement issues.

c. Scientific losses

During 2012, Marine Fisheries staff was not notified of any outside sampling programs.

Management Program of 2013

1. Commercial Fishery

a. Regulations

- 6" minimum size limit
- Season: January 1 - December 31
- Pot diameter not to exceed 16 inches if cylindrical or 201 square inches in cross section if any other configuration
- Mesh no smaller than 3/16 inch bar inside measurement
- Fee: \$100.00
- Use of two pots is permitted for taking killifish or eels for bait, without a license, provided they are not sold or used for barter
- Mandatory daily trip level and dealer transaction reporting is planned for the next five years. Miniature fyke net (eel pot) license holders are required to

report monthly for each month that they possess a license, from January 1 to December 31. All required reports must be filed before a license is issued for the subsequent year.

2. Recreational Fishery

a. Regulations

- 6 inch minimum size limit
- Season: January 1 - December 31
- Harvest and possession of 50 eels per person

3. Fishery Independent Monitoring

In order to collect glass eels, one stream will be sampled for six weeks during late winter/early spring. A commercial glass eel fyke net will be set and tended daily at low tide if possible. The catch will be weighed and counted or sub-sampled if very large. Various environmental and climatological data will be recorded for each catch. In addition, alternative glass eel sampling techniques will be administered in an attempt to increase New Jersey's glass eel sampling capabilities.

Acknowledgements

The enthusiasm and hard work of the many individuals involved with the American Eel Project is greatly appreciated. These include the following Division employees for their assistance with data processing/analysis, laboratory analysis, and field sampling: Jeff Brust, Russ Allen, Tom Baum, Heather Corbett, Maryellen Gordon, Greg Hinks, Debbie Vareha, Peter Clarke, Ed Hale, Nick Marzocca, Pat Barker, Shana Fehring, Matt Heyl, Amber Johnson and Adri Kreuzer-Wozniak.

Table 1. New Jersey's Commercial American Eel Landings in Pounds: 2000-2012

Year	NJ - Total Landings	NMFS - Total Landings	NMFS - Pots	NMFS - Other Gear
2000	-	45,393	45,386	7
2001	-	57,700	57,700	0
2002	-	64,600	64,600	0
2003	-	100,701	100,699	2
2004	-	120,607	119,130	1,477
2005	-	148,127	144,631	3,496
2006	-	158,917	131,002	27,915
2007	169,946	164,331	164,331	-
2008	132,712	140,418	140,211	207
2009	118,533	121,471	120,769	702
2010	105,089	107,803	103,235	2,873
2011	120,576	129,065	126,356	2,551
2012	105,913	*	*	*
Total	752,769	1,359,133	1,318,050	39,230

* 2012 NMFS landings not available

Table 2. Summary of New Jersey's Commercial Biological Samples: 2012

Area	Number of Samples	Mean Length (inches)	Mean Weight (pounds)
Delaware Bay - NJ	140	16.12	0.314
Grand Total	140	16.12	0.314

Table 3. American Eel Disposition from New Jersey Commercial Reporting Forms: 2012

Disposition	Harvest Weight (pounds)
Bait	13,450
Food	89,225
Personal Use	224
Unknown	3,014
Total	105,913

Table 4. Total Number of Glass Eels Caught During Sampling: 2012

LOCATION	GEAR	# DAYS SET	TOTAL # CAUGHT	% OF TOTAL CATCH
PATCONG CREEK	FYKE	31	100,350	34.3%
PATCONG CREEK	COLLECTOR #1	31	124,194	42.4%
PATCONG CREEK	COLLECTOR #2	30	41,177	14.1%
NACOTE CREEK	COLLECTOR	26	27,259	9.3%
TOTAL			292,980	

Table 5. Annual Catch Statistics of American Eel Taken in Impingement Sampling at the Salem Generating Station Circulating Water Intake Structure: 2008-2012

Year	# of samples	Total minutes sampled	Total pump volume sampled (cubic meter)	Collection frequency	Initial Percent			Total # Collected	Mean Density (n/106m3)
					Live	Dead	Damaged		
2008	1,570	2,303	15,262,589	53	64	10	26	58	3.8
2009	1,570	3,124	22,856,457	67	81	4	15	90	3.94
2010	1,560	1,961	13,859,604	47	81	3	16	57	4.11
2011	1,560	1,771	12,079,708	105	95	3	2	134	11.09
2012	1,547	1,824	12,636,133	89	94	0	6	103	8.15

Table 6. Annual Summary of American Eel by Life stage taken in Entrainment Abundance Collections at the Salem Generating Station Circulating Water Intake Structure: 2008-2012

Year	# Samples	Total Volume Filtered (m3)	Larvae		Juvenile	
			Number	Density (n/100m3)	Number	Density (n/100m3)
2008	1,633	83,299	84	0.10	8	0.01
2009	1,694	85,987	96	0.11	14	0.02
2010	1,547	79,069	75	0.09	9	0.01
2011	1,566	80,127	213	0	12	0.01
2012	1,580	80,398	260	0.32	16	0.02



**Figure 1.
New Jersey Commercial Miniature Fyke/Pot Fishery
Submittal Form**



Fisherman name: _____ Gear ID: _____

Landings for period: _____ No. of Pages: _____

I had fishing activity for this period: Yes _____ No _____

Dealer transactions - Please record information for each sale of products to dealers below.

Sale date	Dealer	Disposition	Amount	Units

I certify under penalty of law that the information on this and all subsequent forms is true, accurate, and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate, or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true.

Signature: _____ Date: _____

Forms must be submitted to the New Jersey Division of Fish and Wildlife by the tenth of the month following the month of fishing. For example, all information from January should be submitted by February 10th. Failure to do so will result in enforcement action. Forms may be submitted by fax to (609) 748-2032, by mail, or in person to the following addresses.

MAIL:	NJ DFW American eel reporting P.O. Box 418 Port Republic, NJ 08241	IN PERSON:	NJ DFW Nacote Creek Research Station Mile Post 51, Route 9 Port Republic, NJ 08241
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Electronic reporting of trip data online is also available. Please call Peter Clarke at (609) 748-2020 to set up your online reporting account.

Figure 2.



New Jersey Commercial Miniature Fyke/Pot Fishery Trip Report



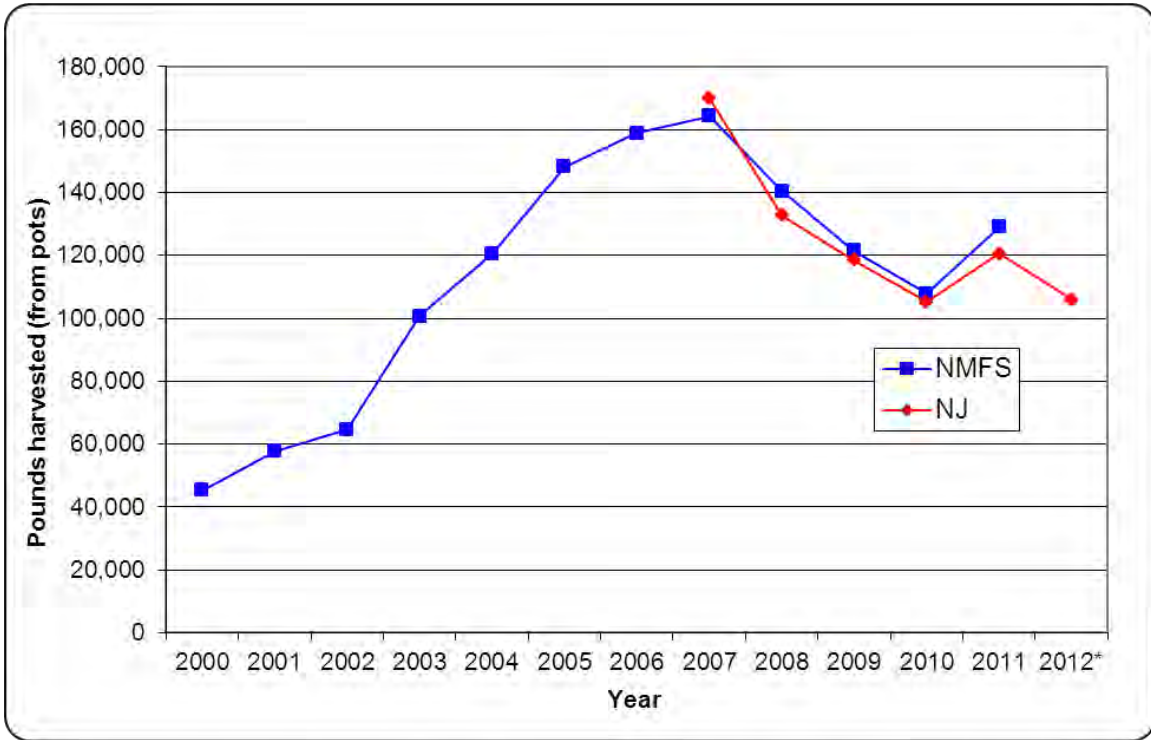
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Vessel name <input style="width: 90%;" type="text"/>	Vessel ID <input style="width: 90%;" type="text"/>

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Figure 3. New Jersey Commercial American Eel Landings: 2000-2012



*2012 NMFS landings not available

Figure 4. New Jersey Commercial Harvest CPUE from Reporting Forms: 2007-2012

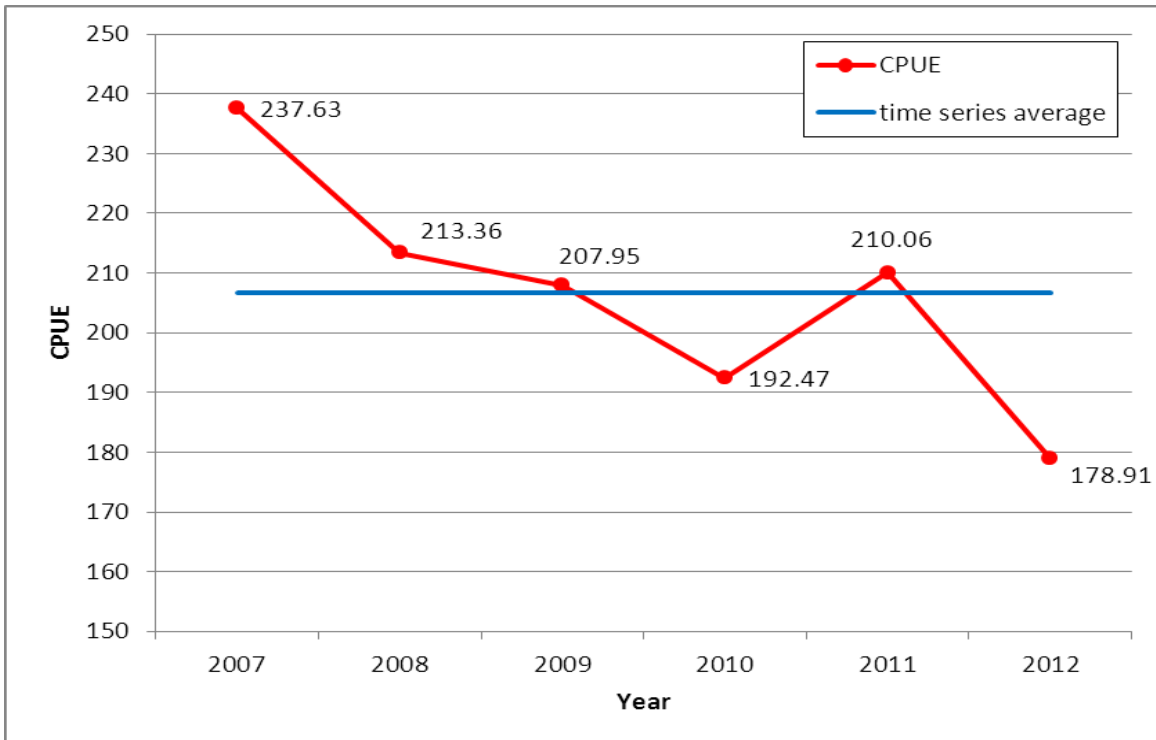
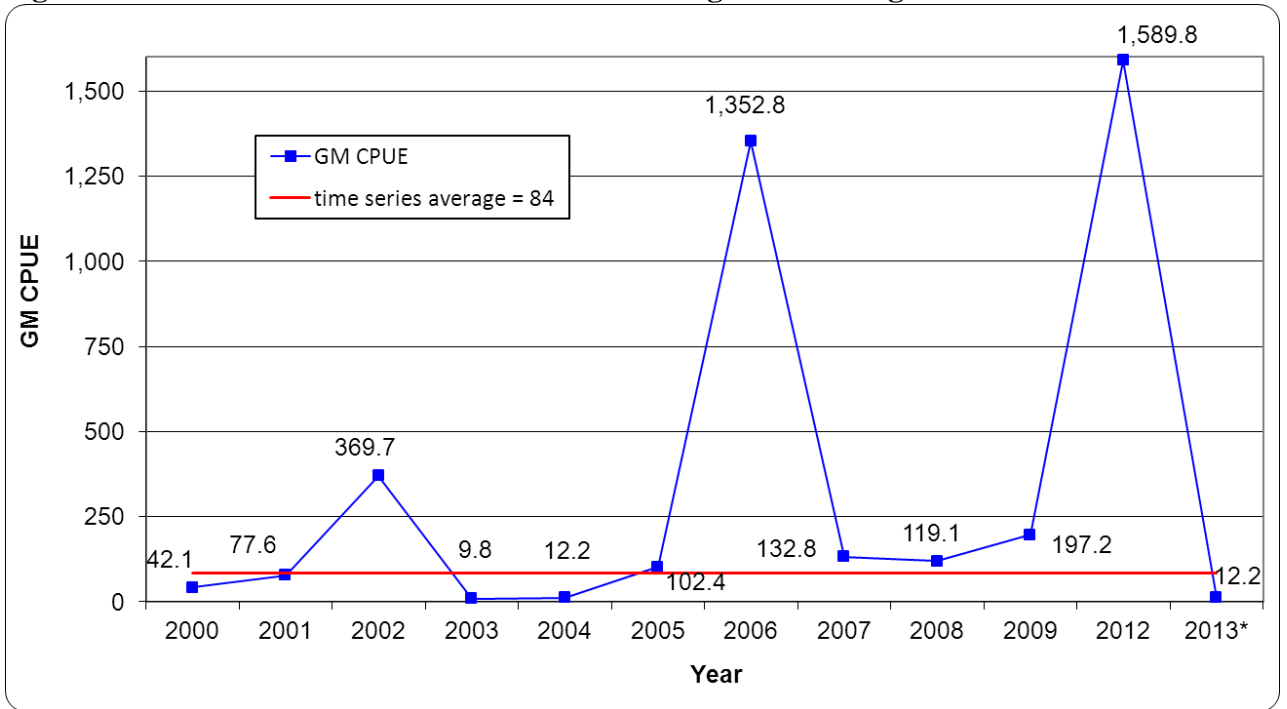
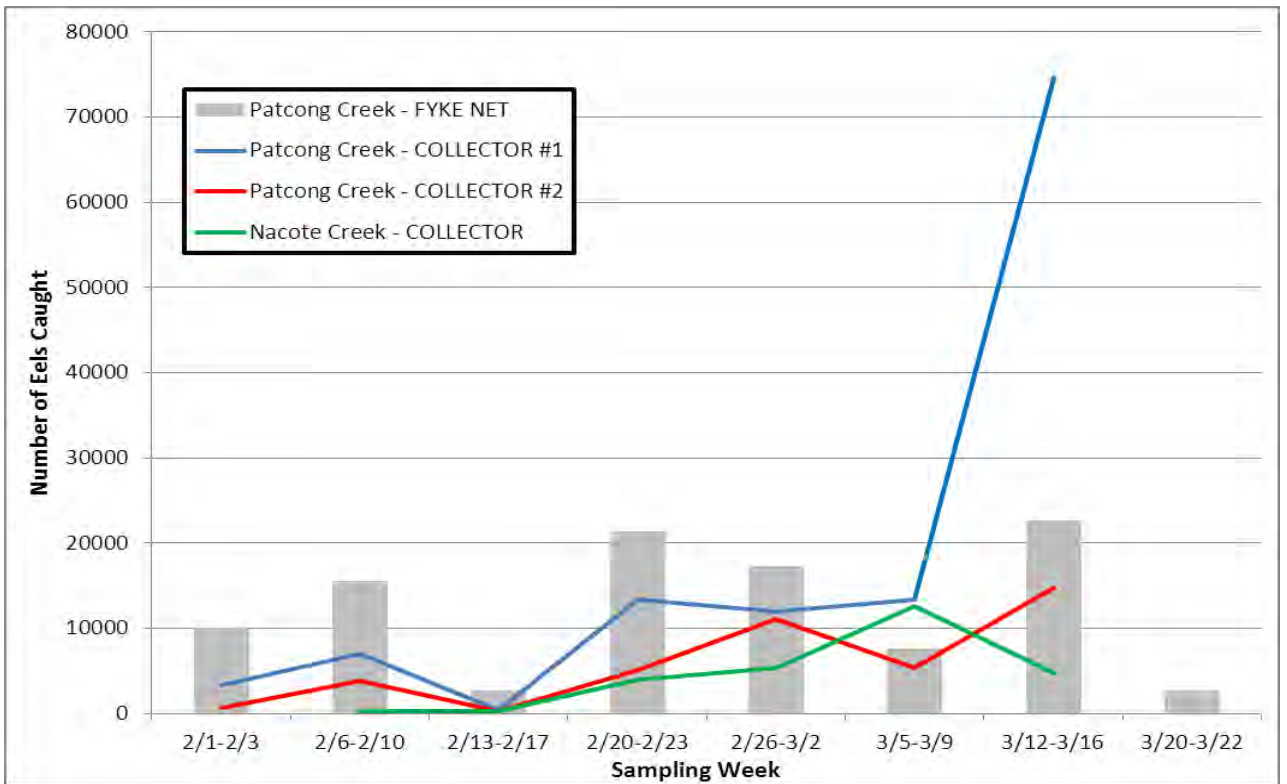


Figure 5. Geometric Mean CPUE of Glass Eels Caught in Patcong Creek: 2000-2013



*2013 data is preliminary

Figure 6. Total Number of Glass Eels Caught by Week: 2012



**American Eel
Annual Compliance Report – For Calendar Year 2012
Commonwealth of Pennsylvania
Pennsylvania Fish and Boat Commission**

2012

1. Commercial Fishery

- a. No commercial fishery for American eel exists in Pennsylvania. Nor may American eel be taken from the wild in Pennsylvania and sold, traded, exported, or otherwise offered for sale or barter whether dead or live.

2. Recreational Fishery

- a. Season: Open all year.
- b. Minimum Length: 8 inches total length. A 6-8 inch length limit applies to fish bait and baitfish dealers. Bait dealers are now regulated by the Pennsylvania Department of Agriculture.
- c. Possession limit: 50 per day. Fish bait and baitfish dealers are authorized to have more than 50 eels in possession providing dealers have a “paper trail” documenting the receipt of eels transported into the Commonwealth.
- d. Gear restrictions: Taking eels is permitted using: rod and reel or hand line, dip net or minnow seine not over 4 feet square or in diameter, or a minnow trap with no more than two openings which shall not exceed 1 inch in diameter. Taking of eels 8 inches and longer is permitted only by hook and line. Unattended minnow traps or baitfish containers left in Commonwealth waters must be identified with the owner’s or user’s name, address, and telephone number
- e. Estimate of recreational harvest by season: Not available.

3. Fishery – Independent Monitoring: Young-of-Year Monitoring.

The 2012 glass eel survey began on March 5 and was completed on April 30 within Section 03 of Poquessing Creek immediately downstream from a dam located 60 meters upstream from the State Road (SR-1007) bridge. Poquessing Creek continued to serve as the sampling location due to low catch rates in the Schuylkill River, near extirpation of Schuylkill River American eels, and the risk of high flows impeding trap function at the Fairmount Fishway, located at the head-of-tide on the Schuylkill River. Poquessing Creek was selected as an alternative location owing to the conclusion of the Philadelphia Academy of Natural Sciences that Poquessing Creek was one of the two most utilized streams by glass eels in the Delaware River watershed (Horwitz et al. 2007).

Sampling was conducted over a six-week period. A single minnow trap modified to collect glass eels was fished approximately 10 m downstream from the dam face. In prior years, a 3 ft x 3 ft square lift net fitted with 1/16 inch stretch mesh had additionally been fished, but has not been used since 2008 due to poor past performance. Typically the fish trap was set on Monday by PFBC personnel and then checked and removed on Friday, although storm flows and occasional personnel schedule conflicts caused the trap to be fished eight days less than the 30 day scheduled maximum. The fish trap was fished for a total of 525 hours and 29 minutes during the 2012 survey. No eels were collected in the trap during the six-week sampling period.

To supplement the glass eel trapping effort, six 50 m sites were electrofished at Poquessing Creek on March 30, April 13 and 30, 2012, utilizing an AC backpack electrofisher for a total of 58, 44, and 49 minutes, respectively (7-9 minutes per 50 m site). Sampling sites began at the upstream side of the railroad bridge located approximately 100 m upstream from the aforementioned dam. Sampling was conducted at low tide; high tides fully inundate the dam. Sampling was conducted slowly along the shoreline in good habitat, which included a mixture of gravel, rubble, sand, and an occasional boulder. Electrodes were generally 2-3 m apart. A total of 712 young-of-year eels

were captured. The mean catch rates were 27.6 fish/50 m site on March 30, 45.7 fish/50 m site on April 13, and 19.4 fish/50 m site on April 30. The average catch rate across the three sampling dates was 30.9 fish/50 m site. These eels ranged from 50 to 94 mm total length and were mainly stage four pigmentation. Young-of-year eels were presumed to be 95 mm or less in total length and were clearly and substantially less robust than the smallest of the slightly longer (by 10+ mm) apparent yearling eels based on Horwitz et al. (2007).

2013 - Planned Management Program

1. Commercial Fishery: None
2. Recreational Fishery: Same as in 2012
3. Fishery-independent monitoring: The annual six week y-o-y translucent glass eel abundance survey in the tidal portion of Poquessing Creek will be terminated with the possible exception that one to three electrofishing runs (six 50 m sites each time) of the type described above may occur within and immediately above the upper tidal zone. Pennsylvania's annual monitoring program will shift to only monitoring small ("pencil") yellow eels in the non-tidal Delaware River via backpack electrofisher while conducting YOY smallmouth bass monitoring at the same sites. Yellow eel abundance has been indexed in this way for over a decade at those sites and data from those sites were the only data from Pennsylvania that was used in the recent ASMFC American Eel stock assessment.
4. Provide summary of bait dealer's purchase and distribution of American eel via dealer permit and reporting database.

De Minimis Status:

Pennsylvania is requesting a continuation of *de minimis* status for American eel as the state does not have a commercial fishery for any life stage and, therefore, falls below the harvest threshold level.

References

Horwitz, R.J., P.F. Overbeck, D.H. Keller, and S.M. Moser. 2007. American eel survey: glass eels and yellow eels in tidal tributaries of the Delaware River in Pennsylvania. State Wildlife Grant Project T-31-R final report to the Pennsylvania Fish and Boat Commission, Harrisburg, PA.

D. Miko
M. Kaufmann

Table 1. Number and pounds of American eels bought and sold by dealers in Pennsylvania in 2012.

Purchases of American eel in 2012	
731,240	Total pounds of American eel (silver and yellow) purchased by PA retailers
0	Pounds of “silver” life stage
731,240	Pounds of “yellow” life stage
784	Pounds of “elver” life stage
0	Pounds of “silver” purchased from other countries for food
0	Pounds of “silver” purchased from NJ for bait
0	Pounds of “yellow” purchased from other countries for food
0	Pounds of “yellow” purchased from other countries for bait
365,778.5	Pounds of “yellow” purchased from US states other than PA for food (CT, DE, FL, MD, NC, NJ, NY, SC, VA) (385 “food,” 365,393.5 “food/bait”)
365,778.5	Pounds of “yellow” purchased from US states other than PA for bait (CT, DE, FLA, MD, ME, NC, NJ, NY, SC, VA) (365,778.5 “food/bait”)
365,893.5	Total pounds purchased for consumption (50% of total pounds purchased) (500 food, 365,393.5 food/bait)
366,043.5	Total pounds purchased for bait (50% of total pounds purchased) (150 bait, 365,893.5 food/bait)
805	Total number of American eel (silver and yellow), in addition to the pounds above purchased by PA retailers
805	Number of “silver” life stage
0	Number of “yellow” life stage
0	Number of “elver” life stage
805	Total number purchased for bait (100%), in addition to the pounds above
805	Number purchased by PA retailers
Retail sales of American eel in 2012	
515,523	Total pounds of American eel (silver and yellow) sold by PA companies (Plus 805 individual eels sold)
0	Pounds of “silver” life stage (Plus 805 individual eels sold)
515,523	Pounds of “yellow” life stage
1,109	Pounds of “elver” life stage
488,150	Pounds sold for consumption (95%)(484,181 “food,” 3,969 “food/bait”)
27,373	Pounds sold for bait (5%)(23,404 “bait,” 3,969 “food/bait”) (Plus 805 individual eels sold)
46,193	Pounds sold by PA retailers to PA customers (plus 805 individual eels sold)
69,164	Pounds sold by PA retailers to other unidentified United States customers (sold to CT, FL, IL, MA, MD, ME, NC, NJ, NY, OH, TX)
38,179	Pounds sold by PA retailers to Canadian customers
351,597	Pounds sold by PA retailers to European customers
805	Total number of American eel (silver and yellow), in addition to pounds above sold by PA companies
805	Number of “silver” life stage
0	Number of “yellow” life stage
0	Number of “elver” life stage
805	Total number sold for bait (100%), in addition to pounds above
805	Number sold by PA retailers to PA customers, in addition to pounds sold



State of Delaware American Eel Fishery Annual Report

September 1, 2013

Delaware retained previously enacted American eel regulations during the past year and stayed in compliance with the Atlantic States Marine Fisheries Commission (ASMFC) Fishery Management Plan (FMP) for American eel. The legislation required to keep Delaware's eel harvesting regulations in compliance with the FMP was passed during 1999 through 2000, and the monitoring programs required by the FMP began in February 2000. American eel supported an important fishery in Delaware during 2012. ***Data displayed in Table 2 (page 7) is considered confidential and should be removed prior to public distribution.***

1. Commercial fishery

a. Synopsis of regulations in place

1. *Open Season*: All year
2. *Minimum Length*: 6 inches total length
3. *Trip Limit*: No limit
4. *Eel Pot Limit*: No limit
5. *Minimum Mesh Size*: None

A commercial eel fishing license is required to take and sell 25 or more eels per day or to fish more than two eel pots per day. This is an open fishery and licenses cost \$115 for residents and \$1,150 for nonresidents. Legal commercial gear includes fyke or hoop nets, seines, minnow traps, or eel

pots. Eel pots are not restricted in mesh size or overall size. Commercial eel fishing is restricted to tidal waters.

b. Estimates of directed harvest

1. Pounds landed by life stage and gear type

Commercial eelers in Delaware landed 54,304 pounds of American eel in 2012, a 41% decrease from the 92,181 pounds landed in 2011 and 50% less than mean annual landings during 1999 through 2012 (109,615 lbs.). 2012 landings were the lowest reported since logbook reporting was made mandatory in 1999. (Figure 1).

American eels ranked fourth in pounds landed and third in value among all fish species landed commercially in Delaware during 2012 (G. Glanden, DDFW, personal communication). Delaware Bay and River ports, including ports on Delaware Bay and River tidal tributaries, accounted for 81% of 2012 landings and the Inland Bays ports accounted for the remaining 19% of landings (Table 1).

The number of eel licenses sold decreased to 62 in 2012 from 63 in 2011 and 2012 was the seventh year in a row in which fewer than 70 eel licenses were issued. Although 62 licenses were issued, only 13 licensees reported landing eels in 2012 while 41 reported they did not fish for eels and 8 did not submit any report.

2. Biological data taken from sampled commercially-caught American eel

A sub-sample of 115 commercially caught American eels were measured and weighed and 112 of the 115 were aged to estimate the composition of the commercial catch.

The sampled eels ranged in length from 180 to 698 mm with a mean length of 376 mm, and ranged in weight from 12 to 685 g with a mean weight of 130 g. The length-weight relationship, $W=1.536E-9L^{3.038}$ returned a weight of 102 g for an eel with the mean length of 376 mm.

The sampled eels ranged in age from 2 to 8 years old, with a mean age of 4. Approximately 90% of eels sampled were 3 through 5 years old, with 79% at age 3 and 4 years. The mean length at age increased rapidly from ages 2 through 4 and ages 5 through 7, although there was much overlap in the range of lengths at each age (Figure 2). American eels aged 6, 7 and 8 constituted only 8% of the catch which suggested that eels older than 5 were not common among eels caught with commercial gear in Delaware tidal waters in 2012. The mean age of the 2012 commercially caught eels was the same as the mean age of eels caught commercially from 2007 through 2011(DDFW 2012).

3. Estimated percent of harvest going to food versus bait

Yellow eels harvested for food consumption comprised 44,406 pounds or 82% of total reported landings, and bait eels comprised the remaining 9,898 pounds or 18% of the total (Table 1). Bait eel landings were higher in the fall than in the spring and summer, as bait eel demand is much higher in the fall during the height of the recreational striped bass fishery along the Atlantic coast. Eels in the bait eel size range (<350 mm) were sold as food eels when there was insufficient demand for bait eels.

c. Estimates of export by season

Delaware did not require dealers to report the final destination of commercially caught eels but the landings reports submitted by eelers provided information on the timing and disposition of the landings. Annual eel landings were highest in the spring and fall with peaks occurring in April through May and September through October. Eel cooperators reported that most bait eels were delivered to bait dealers supplying coastal recreational fisheries in Delaware, Maryland, Virginia and the Carolinas, although there is an increasing demand for bait eels supplied to recreational fisheries on large southern freshwater lakes and impoundments. The food eels were sold almost exclusively to a single eel dealer, but several eelers mentioned the possible entry of another eel buyer in the coming year.

d. Harvest data provided as CPUE

Effort, measured in eel pot days decreased by 30% between 2011 and 2012. Catch per pot day, measured in pounds caught per pot per day fished decreased 16% between 2011 and 2012 (Figure 1). Delaware eelers averaged 1.13 pounds of eels per eel pot per day during 2012, below the mean catch per pot per day (1.75) for the time series.

2. Recreational Fishery

a. Synopsis of regulations in place

1. *Open Season:* All year
2. *Minimum Length:* 6 inches total length
3. *Possession Limit:* 50 per day
4. *Eel Pot Limit:* 2 per person

- b. Estimate of Delaware 2012 recreational catch from the Marine Recreational Information Program (MRIP) report (Newlin and Glanden 2013).

Months (2012)	Number of eels caught ¹
March-April	2,696
May-June	1,745
July –August	15,353
September – October	4,833
November - December	349
TOTAL	24,976

¹ Eels caught was an estimate based on creel surveys and included eels kept and eels released. Eels caught were reported in numbers not pounds. Neither individual nor aggregate weight estimates were made in the report.

The 2012 estimated recreational catch was 28% lower than the 2011 estimated catch (34,550), 37% higher than the 2010 estimated catch (18,174), and 18% higher than the 2009 estimated catch (21,077).

3. Fishery-independent monitoring

- a. Young-of-the-year abundance survey for 2013

The 2013 young-of-the-year abundance survey summary is in Appendix 1

- b. Other fishery-independent data

Delaware Division of Fish and Wildlife has several ongoing fisheries research projects that regularly capture American eels. American eels captured during the course of these projects are counted and measured, and subsamples of the captured eels are kept for age analysis. University of Delaware completed a study of silver eel emigration from the Indian River drainage in 2004 (Barber 2004). Delaware State University completed a study of eel movements in Silver Lake, a freshwater impoundment in the St. Jones drainage, in 2006 (Thomas 2006) as well as a study of eel movement, growth, population size, and air bladder parasite infestation in the tidal portion of the St. Jones River since 2006 (Cairns 2009).

c. Projects planned for next five years

Delaware will continue all current eel monitoring projects. No new projects are planned.

4. Characterization of other losses

Delaware has several power and industrial plants that extract large amounts of cooling water. Most of these intakes are located along the Delaware River in the Wilmington area, but there is also a large power plant on Indian River in Delaware's Inland Bays. Two major power plants conducted fish impingement monitoring of their cooling water intake screens. American eels comprised less than 1% of fish caught during two years of impingement sampling at the Edge Moor Power Plant on the Delaware River near Wilmington (Entrix Inc. 2002). Fourteen American eels were caught during impingement samples and 20 juvenile American eels were caught during entrainment samples taken during December 1999 through November 2000. Thirty two American eels were caught in impingement samples and 16 juvenile American eels were caught in entrainment samples taken during December 2000 through November 2001. American eels also comprised less than 1% of all fish caught during two years of sampling at the Indian River Power Plant on Indian River near Millsboro (Entrix 2003). Six American eels were caught in impingement samples and 31 juvenile American eels were caught during entrainment samples taken during December 1999 through November 2000. Six American eels were caught in impingement samples and 26 juvenile American eels were caught in entrainment samples taken during December 2000 through November 2001. These plants run continuously and the impingement and entrainment samples represented a very small fraction of annual running time, thus the number of eels impinged and entrained annually could be substantial.

Bycatch mortality of American eel in other fisheries was not quantified but was probably low since those fishing methods commonly used in Delaware do not target, and therefore rarely catch eels.

Poaching losses apparently were minimal during 2012. No glass eel poaching arrests were made during 2012.

Delaware Division of Fish and Wildlife took American eels for scientific purposes in order to comply with the American eel FMP during 2012. Eels kept for measurements during the glass eel monitoring conducted during February through March exhibited five percent mortality. An additional number of glass eel mortalities occurred during the monitoring period due to handling stress but no estimate was made as to the total. The Division also sacrificed 115 yellow eels during 2012 for age and growth analysis.

One fish kill involving American eel was reported at a freshwater impoundment during 2012. On July 18, 2012, approximately 30 eels were

found dead at Silver Lake in Dover, Delaware, as a result of extremely low dissolved oxygen levels.

References cited

- Barber, R. 2004. Sex ratio of silver American eels (*Anguilla rostrata*) migrating out of two southern Delaware streams. Master's thesis, University of Delaware, Newark.
- Cairns, C. M. 2009. Population ecology of yellow-phase American eels (*Anguillarostrata*) in the St. Jones River, Delaware. Master's thesis, Delaware State University, Dover.
- Entrix, Inc. 2002. An ecological risk-based 316(B) evaluation for the Edge Moor Power Plant. Prepared for: Conectiv, Inc. Wilmington DE.
- Entrix, Inc. 2003. An ecological risk-based 316(B) evaluation for the Indian River Generating Station. Prepared for: NRG Energy Millsboro, DE.
- Newlin, S. and G. Glanden. 2013. Marine recreational fishing in Delaware 2012. Annual landings report. Delaware Division of Fish and Wildlife, Dover, DE 19901.
- Thomas, J. C. 2006. American eel behavioral patterns in Silver Lake, Dover, Delaware. Master's thesis, Delaware State University, Dover.

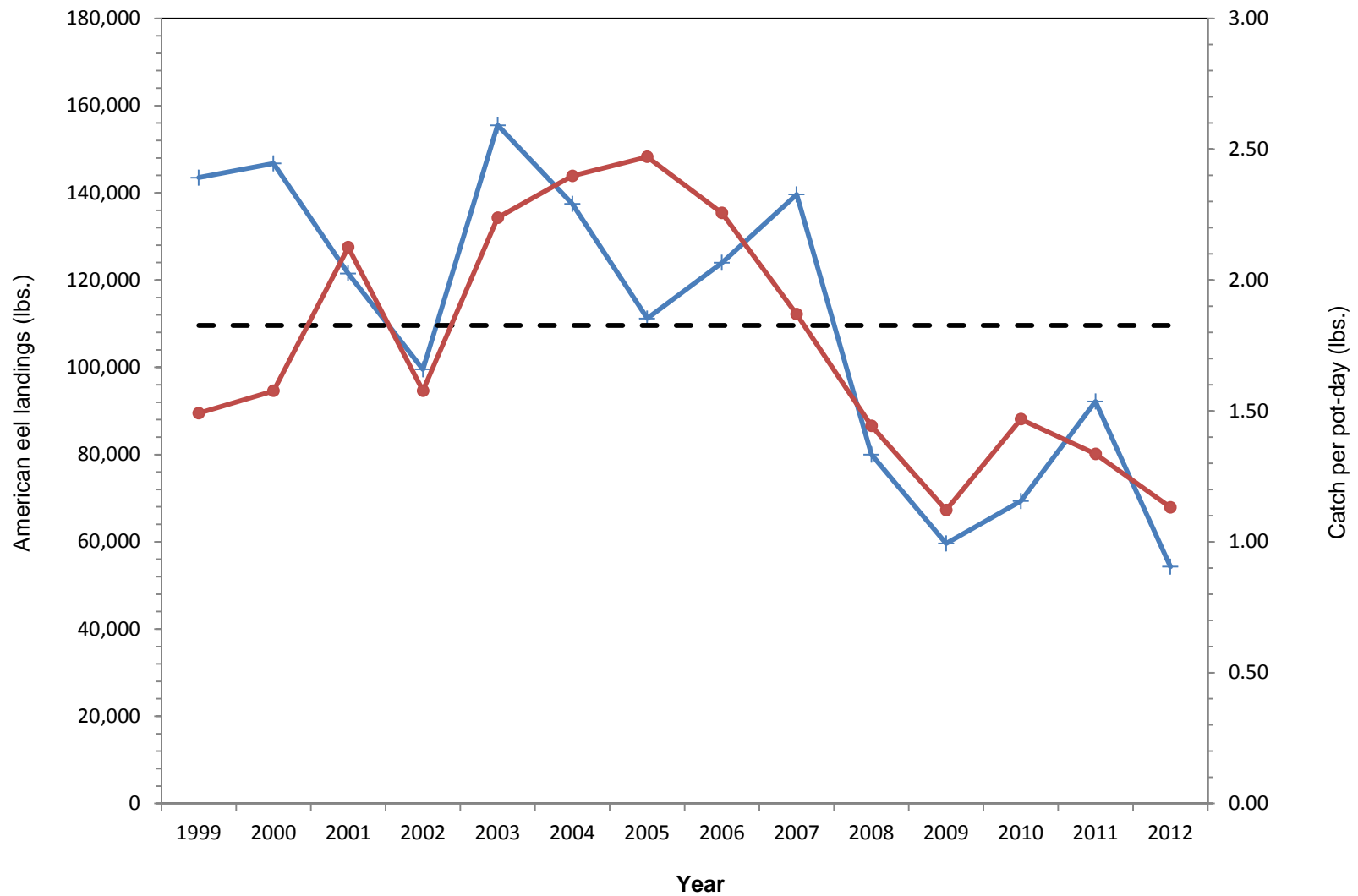


Figure 1. American eel commercial landings in pounds (+) and pounds caught per pot-day (dot) in Delaware during 1999 through 2012. Mean landings (109,615 lbs.) for the time series represented by the dotted line.

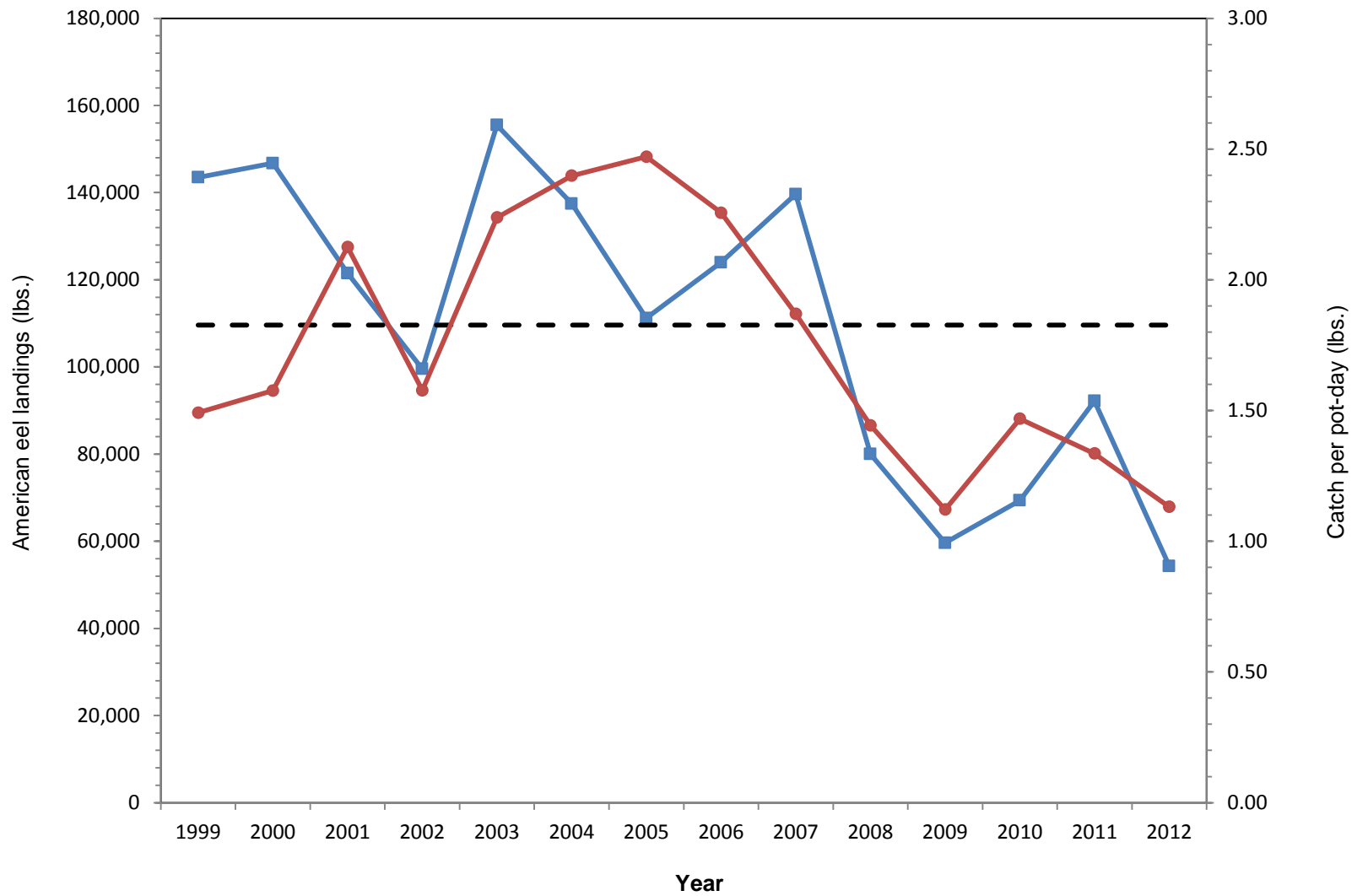


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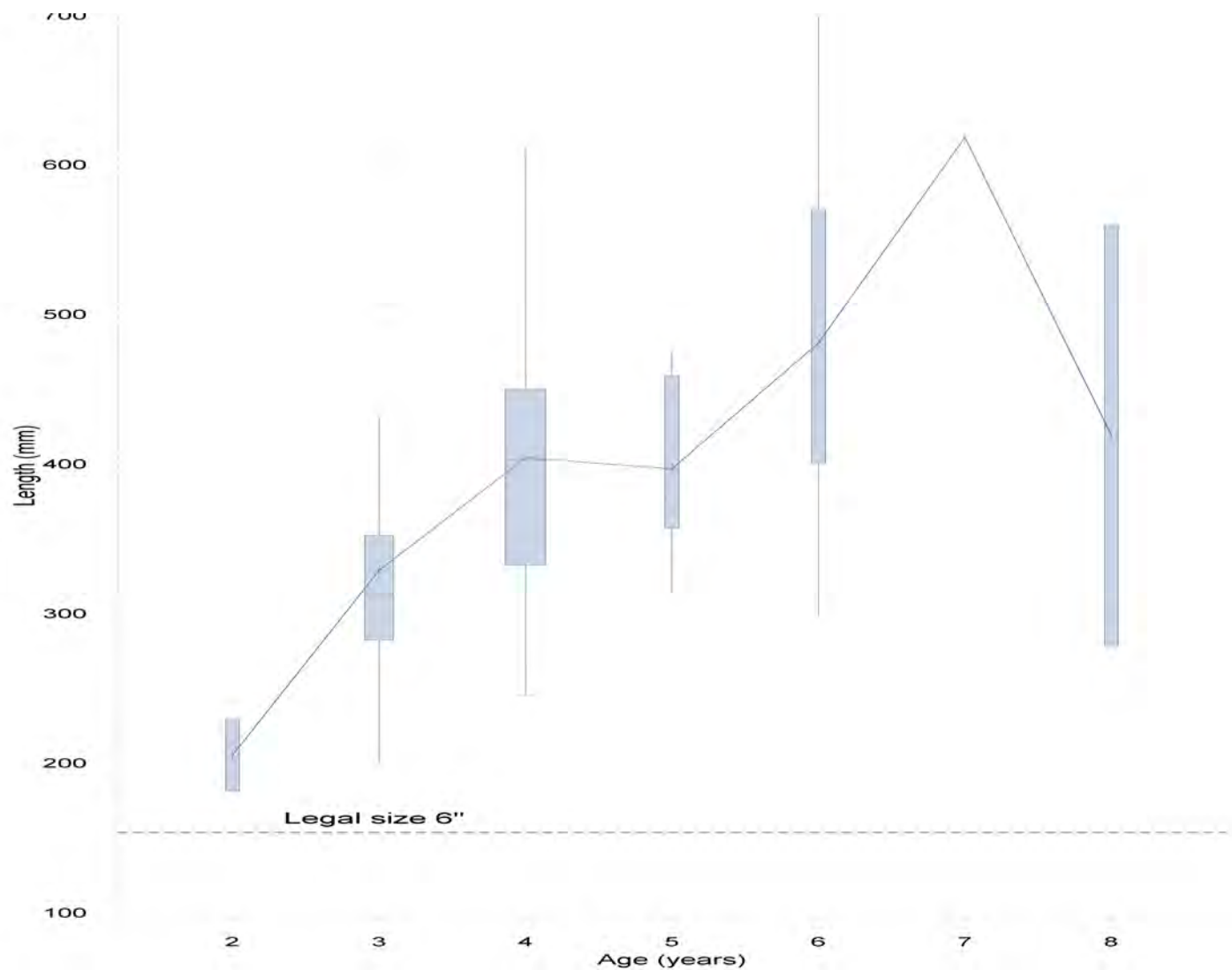


Figure 2. Boxplot of length by age for all 2012 commercially-caught American eels (N=112). Line connects mean values, box represents median, 25 and 75 quartiles, and whiskers extend to furthest values. Box width increases with number of observations. No box drawn if age represented by a single observation.

Appendix 1.

Glass eel monitoring in Delaware during 2012

The Atlantic States Marine Fisheries Commission (ASMFC) Interstate Fishery Management Plan (FMP) for American eel, passed in October 1999, requires all member states to monitor the migration of glass eels to freshwater. Perceived declines in glass eel numbers during the past 20 years were a major impetus to passing an FMP for American eel (ASMFC 2000). Delaware established a glass eel monitoring program in February 2000 and monitored glass eels during February, March, and April 2012.

Monitoring site

Delaware chose to monitor a single sample site, in compliance with the FMP, due to logistical constraints associated with eel sampling. The site chosen was the spillway of Millsboro Pond in southern Delaware (Figure 1). Millsboro Pond spillway is approximately 12 miles from the Atlantic Ocean and it is the first barrier glass eels migrating to freshwater encounter in Indian River. This site was considered the best location in the state for capturing glass eels and elvers (A. Hurd and J. Hennessey, Delaware Division of Fish and Wildlife (DDFW) Enforcement Section, personal communication). This site also complies with the FMP recommendations for optimal site location: at the head of tide of small streams or estuaries and as close to the Atlantic Ocean as possible. Indian River is part of Delaware's Inland Bay system, which supports an active yellow eel fishery. Approximately 19% of Delaware's 2012 commercial eel landings came from the Inland Bays (G. Glanden, DDFW, personal communication).

Monitoring materials and methods

Glass eels were captured with a 4-foot x 4-foot mouth, 1/32-inch mesh wingless elver fyke. This gear was copied from a net confiscated from glass eel poachers by DDFW Enforcement Agents, who reported that this was the gear of choice among glass eel poachers. The cod end of the fyke was attached to a 4-foot x 2-foot x 2-foot live car, also of 1/32-inch mesh, to prevent large catches of elvers from being suffocated in the confines of the fyke's cod end.

The fyke was set along the edge of the southern bridge foundation in the spillway at the base of the dam at Millsboro Pond facing downstream. This part of the spillway was reported to be the best area of the spillway to catch glass eels, based on observations of glass eels, and numbers of eel poachers (A. Hurd and J. Hennessey, DDFW Enforcement Section, personal communication). Counter currents at this part of the spillway ensured water flowed into the net at all tide stages and caused water to flow into the net during outgoing tides.

Monitoring began on February 3 and continued for eight weeks until April 4 for a total of 31 days fished. Storm conditions on several potential monitoring days required removal of the fyke from the sampling site which resulted in the net not being fished every day of each monitoring week.

The net was typically set each sampling week between 0830 hr and 0930 hr or 1230 hr and 1330 hr (depending on the time of low tide) on Monday, then emptied and reset 24 hours later on Tuesday through Thursday, and finally emptied and removed on Friday prior to the weekend.

Date, time of set, moon phase, water flow, water temperature, salinity, and dissolved oxygen were recorded at the start of each sample, and date, time of catch, water flow, water temperature, salinity, dissolved oxygen and gear condition (anomalies) were recorded at the conclusion of each sample.

The captured glass eels were counted each time the net was emptied. If many glass eels were caught, the catch was volumetrically enumerated with a splitter box (Winner and McMichael 1997) and released on the upstream side of the dam to avoid repeated capture. All eels were kept for measurements if they numbered 60 or less, otherwise a sub-sample of 60 was retained. Specimens were measured to the nearest 0.01 mm, weighed to the nearest 0.01 g and assigned a pigmentation stage based on the method developed by Haro and Krueger (1988).

Monitoring results and discussion

The fyke-net captured an estimated 452,444 glass eels during the 31 sample days at the Millsboro Dam spillway during 2012. Catches ranged from 1,664 to 84,992 eels per sample day (Table 1), with a median of 10,496. The geometric mean was 9,631 glass eels per sample day (Table 3), nearly double the highest value in the twelve year time series. The highest daily catch occurred during February, but glass eel recruitment was strong throughout the monitoring period (Figure 2). Daily catch fluctuated during the monitoring period but was consistently high relative to other years.

Glass eels ranged in total length from 48.4 to 65.7 mm, with a mean length of 57 mm, and in weight from 0.07 to 0.26 g, with a mean weight of 0.15 g. The daily length range varied and displayed no definitive trend during the monitoring period (Figure 3).

Pigmentation stage of the sampled glass eels ranged from 1 to 7, with a mean stage of 3 during the monitoring period. Daily mean pigmentation stage displayed an increasing trend through the sampling period (Figure 4), as it did in 2011 (DDFW 2012). This suggested that most of the recruitment to Indian River occurred early in the monitoring period. In the years prior to 2012, the mean pigmentation stage often decreased during high catch weeks and increased during low catch weeks. This may be in part the result of samples comprised mostly of recent recruits during high catch weeks, while the catch during low catch weeks was comprised of glass eels that had been in Indian River for a longer period (DDFW 2012).

Water temperature ranged from 3.71° to 17.20° C, with a mean temperature of 10.14° C during the monitoring period (Table 2a). Glass eel abundance did not appear to be substantially effected by water temperature during the monitoring period. This is most likely due to well above average water temperatures throughout the monitoring period.

Water flow at the spillway ranged from 41 to 118 cubic feet per second (cfs) with a mean flow of 60 cfs during the monitoring period (Table 2b). Mean

flow in 2012 was 48% lower than the mean flow (116 cfs) for the 2000 through 2012 monitoring periods. The high abundance of eels sampled suggests this low flow did not contribute to a decline in eel abundance.

Millsboro Pond is a large source of freshwater in close proximity to the ocean and the outflow was highly attractive to migrating glass eels. This sampling site, located in the spillway below the dam, proved to be very effective for glass eel monitoring because it concentrated migrating glass eels in a small area and the dam was a major impediment to migrating eels. While the dam was an excellent location for glass eel monitoring, it was probably detrimental to glass eel survival. Although the dam was not high, it had a nearly vertical wall and the water flowing over the dam tended to shoot out rather than flow down the face which suggested glass eel passage over the dam was minimal. The large number of glass eels caught in the spillway suggested that glass eels migrate to the dam and remain there for a time as they attempt to move further upstream. Commercial eel landings from the Inland Bays in 2012 were substantial, suggesting that glass eels blocked from upstream passage may thrive in the Inland Bays. Glass eels blocked from upstream passage at the Millsboro Pond dam eventually disperse, but the concentration of glass eels at the spillway must have provided bountiful prey for predators in the area. It is no surprise that in past years this location was ideal for glass eel poaching.

The 2012 glass eel catch was the highest annual catch for the time series, and was 462% higher than the 2011 glass eel catch (Table 3). The geometric mean daily catch was 451% higher than the 2011 geometric mean. Low catches in 2008, 2009 and 2010 resulted in a declining trend in American eel recruitment to Indian River during the 2000 through 2010 time series, however, the increased glass eel abundance in 2011 followed by the record 2012 eliminated the declining trend for the 2000 through 2012 time series and demonstrated the volatility of glass eel recruitment at this site (Figure 5).

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Table 1. Glass eels caught by date at Millsboro Dam spillway from February through April 2012.

Date	Glass eels	
	Number caught	% of total
February 3, 2012	12,208	2.70%
February 7, 2012	33,088	7.31%
February 8, 2012	84,992	18.79%
February 9, 2012	2,512	0.56%
February 10, 2012	6,784	1.50%
February 14, 2012	1,856	0.41%
February 15, 2012	5,376	1.19%
February 16, 2012	2,768	0.61%
February 17, 2012	2,880	0.64%
February 21, 2012	6,880	1.52%
February 22, 2012	10,496	2.32%
February 23, 2012	7,424	1.64%
February 24, 2012	7,104	1.57%
February 28, 2012	16,384	3.62%
February 29, 2012	28,032	6.20%
March 1, 2012	4,032	0.89%
March 2, 2012	1,664	0.37%
March 6, 2012	21,952	4.85%
March 7, 2012	3,648	0.81%
March 8, 2012	18,460	4.08%
March 9, 2012	30,848	6.82%
March 13, 2012	13,392	2.96%
March 14, 2012	17,216	3.81%
March 15, 2012	22,528	4.98%
March 16, 2012	16,448	3.64%
March 20, 2012	8,992	1.99%
March 21, 2012	19,968	4.41%
March 27, 2012	15,072	3.33%
March 28, 2012	17,920	3.96%
April 3, 2012	7,488	1.66%
April 4, 2012	4,032	0.89%
All	452,444	100%

Table 2. (a) Water temperature (°C) by month during 2001 through 2012 glass eel monitoring periods, (b) Water flow (cubic feet per second) at Millsboro Pond spillway during 2001 through 2011 glass eel monitoring periods.

(a)

Year	Month	Minimum Temp.	Maximum Temp.	Mean Temp.
2001	February	4.93	8.61	6.59
2001	March	4.72	12.26	8.22
2002	January	4.76	10.62	6.75
2002	February	3.89	10.96	7.30
2002	March	6.69	13.00	9.78
2003	January	2.70	2.70	2.70
2003	February	3.30	4.23	3.61
2003	March	6.37	15.45	10.90
2003	April	7.36	14.00	10.11
2004	February	2.63	6.94	4.94
2004	March	7.34	12.43	9.50
2004	April	7.25	9.80	8.63
2005	February	3.70	8.08	5.89
2005	March	2.10	10.99	6.77
2005	April	10.16	13.60	12.20
2006	February	3.77	8.07	5.69
2006	March	3.01	16.20	8.89
2007	February	1.20	5.47	3.71
2007	March	2.70	17.30	9.82
2007	April	8.80	16.10	13.73
2008	February	2.58	11.51	6.61
2008	March	7.54	12.00	10.38
2009	February	1.19	5.65	3.17
2009	March	8.71	12.02	10.50
2009	April	10.96	14.32	12.38
2010	March	3.33	14.64	9.58
2010	April	13.34	21.12	16.63
2011	February	4.08	6.12	5.13
2011	March	7.57	13.70	10.54
2011	April	9.24	16.11	13.47
2012	February	3.71	11.50	7.60
2012	March	7.50	17.20	12.83
2012	April	14.70	16.60	15.65

(b)

Year	Minimum Flow	Maximum Flow	Mean Flow
2001	84	168	117
2002	27	44	34
2003	90	373	203
2004	91	254	124
2005	98	390	143
2006	64	151	103
2007	92	211	126
2008	40	87	56
2009	66	91	76
2010	149	405	228
2011	48	108	70
2012	41	118	60

Table 3. Total, median and geometric mean glass eel catch at Millsboro Pond spillway during 2001 through 2012 glass eel monitoring periods.

Year	Number of samples	Total caught	Mean	Median	Geometric mean (GM)	Upper 95% C.I. of Geometric mean	Lower 95% C.I. of Geometric mean	% change of GM from previous year
2000	21	151,176	7,199	612	864	1,680	444	
2001	25	343,066	13,723	6,083	4,808	8,364	2,763	456%
2002	26	239,180	9,199	9,526	5,832	8,577	3,966	21%
2003	25	81,233	3,249	837	626	1,379	284	-89%
2004	28	148,642	5,309	2,820	1,937	3,773	995	210%
2005	27	150,634	5,579	1,576	1,202	2,487	581	-38%
2006	28	252,043	9,002	3,344	2,398	4,776	1,204	99%
2007	25	318,053	12,722	1,136	1,252	2,706	579	-48%
2008	17	40,126	2,360	792	690	1,433	332	-45%
2009	21	32,482	1,412	1,168	819	1,380	489	19%
2010	25	50,414	2,017	1,552	649	1,319	319	-21%
2011	26	97,907	3,766	1,695	1,748	2,593	1,179	169%
2012	31	452,444	14,595	12,208	9,631	15,875	4,147	451%

All Years		2,357,400	6,471	1,816	1,490	1,803	1,231	
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2005	27	150,634	5,579	1,576	1,202	2,487	581	-38%
2006	28	252,043	9,002	3,344	2,398	4,776	1,204	99%
2007	25	318,053	12,722	1,136	1,252	2,706	579	-48%
2008	17	40,126	2,360	792	690	1,433	332	-45%
2009	21	32,482	1,412	1,168	819	1,380	489	19%
2010	25	50,414	2,017	1,552	649	1,319	319	-21%
2011	26	97,907	3,766	1,695	1,748	2,593	1,179	169%
2012	29	440,924	15204	12,208	10,011	15875	4147	473%

All Years		2,345,880	6,471	1,816	1,490	1,803	1,231	
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Figure 1. Location of Millsboro Pond spillway (arrow) on Indian River, Delaware. Spillway is approximately 12 miles from Indian River Inlet.

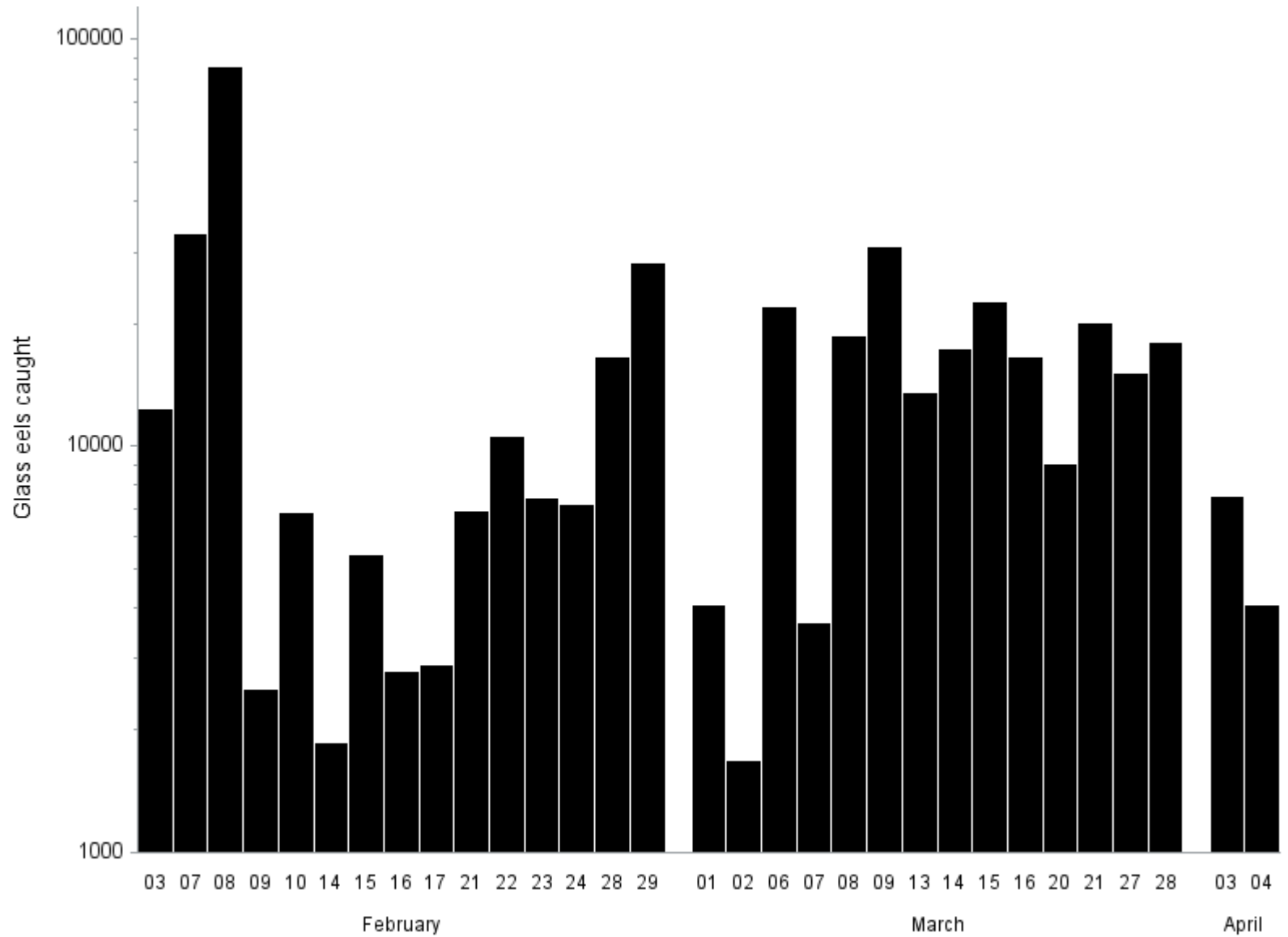


Figure 2. Glass eel catch by date during 2012 monitoring period. The response axis scale is irregular due to the large variation in daily catches.

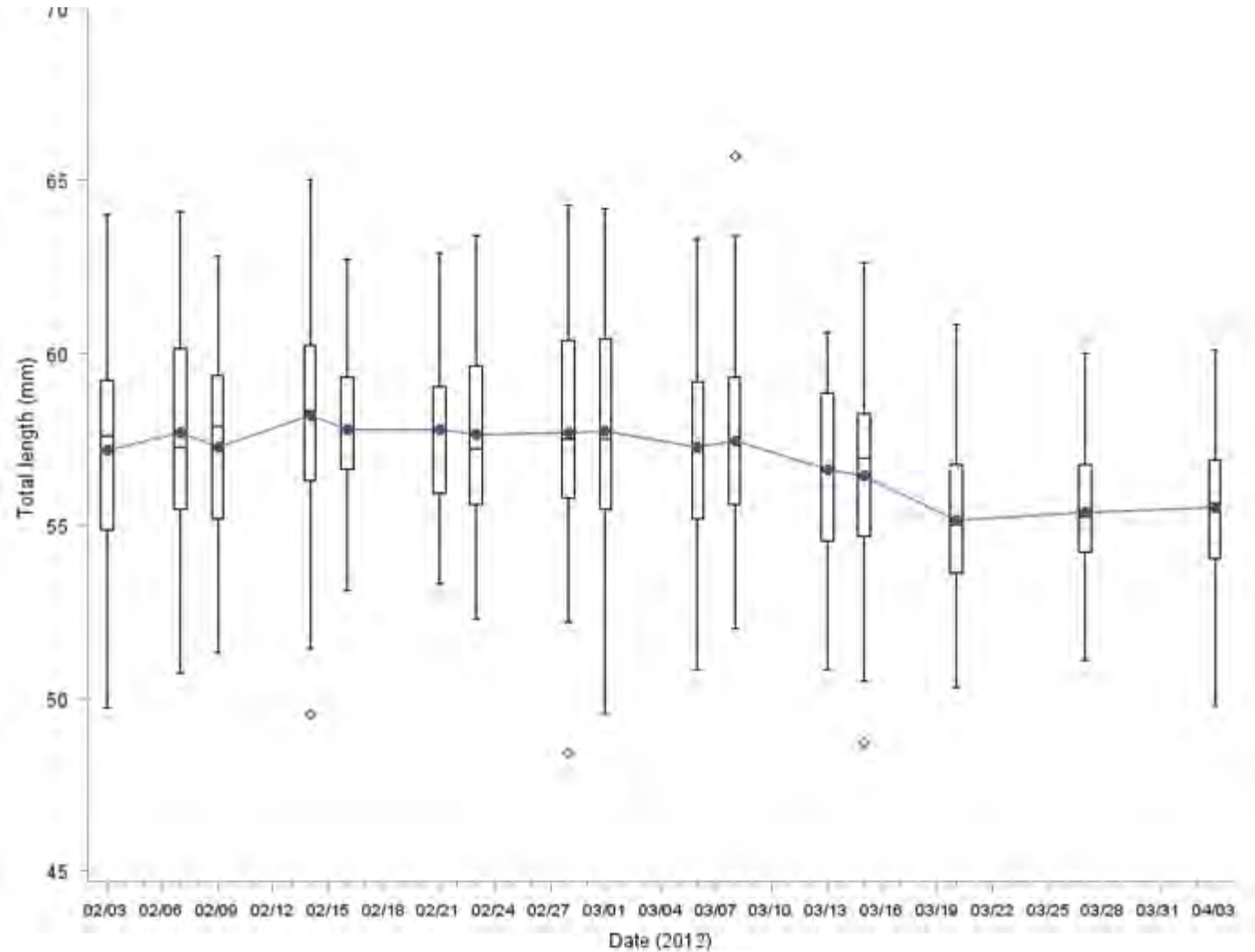


Figure 3. Boxplot of glass eel total length by date during 2012 monitoring period. Line connects mean values, box represents median, 25th and 75th quartiles, whiskers extend to furthest value within 1.5 times the interquartile range, and diamonds represent outside values. Box width increases with number of observations.

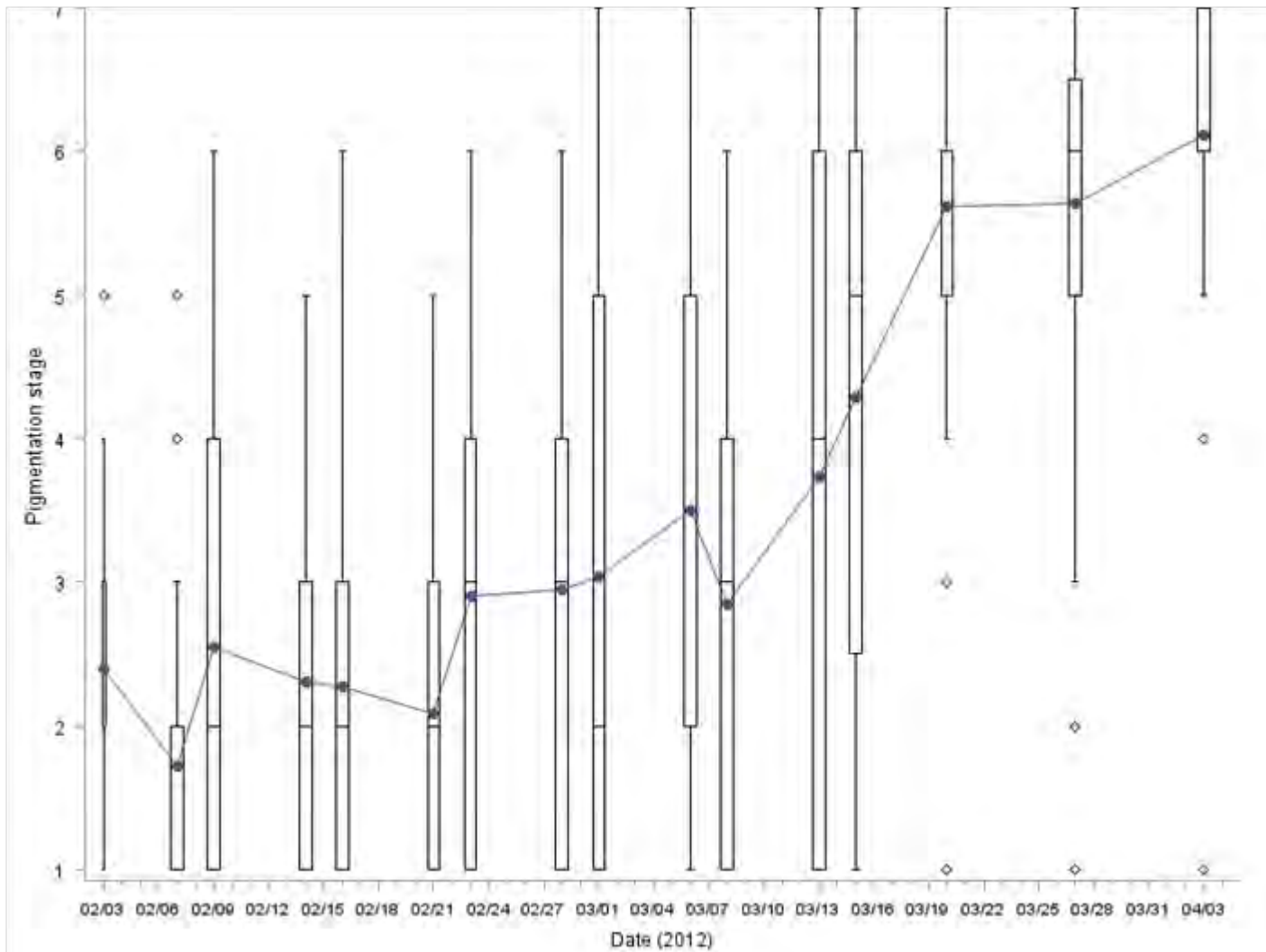


Figure 4. Boxplot of glass eel pigmentation stage by date during 2012 monitoring period. Line connects mean values, box represents median, 25th and 75th quartiles, whiskers extend to furthest value within 1.5 times the interquartile range, and diamonds represent outside values. Box width increases with number of observations.

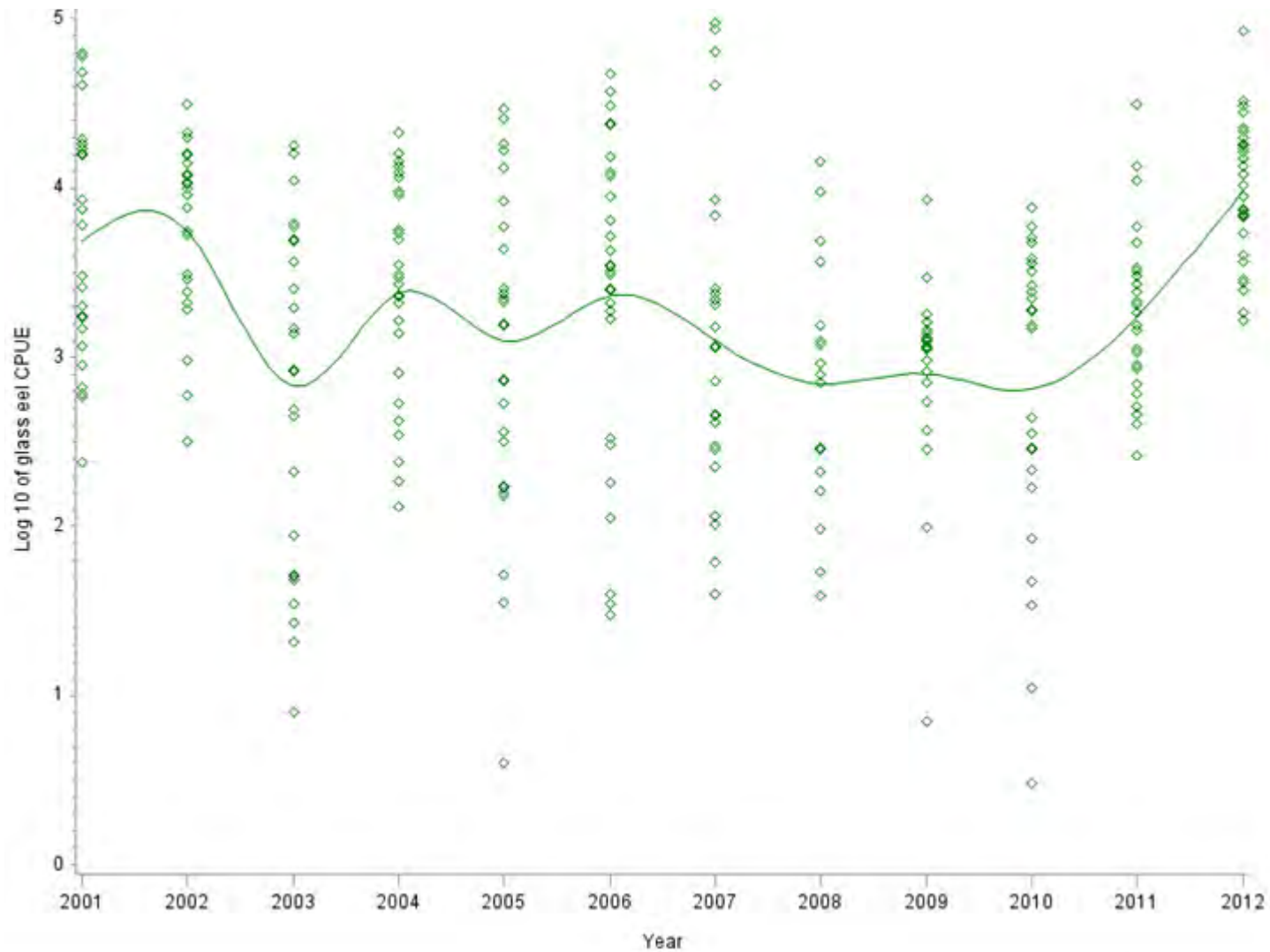


Figure 5. Scatter and smooth line plot of the log 10 CPUE vs. year for 2001 through 2012 glass eel monitoring.



Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor

**State of Maryland American Eel (*Anguilla rostrata*) Compliance Report
to the Atlantic States Marine Fisheries Commission
Calendar Year 2012**

**Prepared by: Keith Whiteford
Fisheries Service
Maryland Department of Natural Resources
August 2013**

I. COMMERCIAL FISHERY

a. Synopsis of regulations in place – 2012 season

1. Submittal of monthly commercial catch reports with daily information (lbs. landed, gear type, and amount by area) is required.
2. No closed season.
3. Minimum length of 6 inches except with appropriate aquaculture permit. A person may catch, possess, or sell up to 25 eels less than 6 inches total length daily for commercial purposes.
4. No possession limit.
5. A license is required to catch eels for sale in tidal waters. Commercial fishing is prohibited in non-tidal waters. Limited entry exists for new commercial fisherman.
6. Except as provided for in (7), an eel pot shall be constructed of wire having a mesh size not less than ½ inch square when the wire mesh is unstretched.
7. An eel pot constructed with mesh smaller than ½ inch by ½ inch shall have an escape panel installed in an exterior wall of the retention chamber made of ½ inch by ½ inch mesh measuring at least 16 square inches.
8. A person may not set buoyed eel pots in those channels designated as crab pot buoy-free channels or other prohibited channels.
9. A commercial crabber who is licensed to catch crabs may use up to 50 eel pots per day to catch eels for personal use as trotline bait with no harvest limit, and must submit eel catch reports (lbs. landed and gear amount by area).

b. Estimates of directed harvest-calendar year 2012

1. Pounds landed by life stage and gear type

A distinction is not made between life stages of American eel in Maryland commercial records. Legal commercial gear does not retain eels less than 6 inches in length, therefore glass eels and elver stage eels are not harvested in Maryland waters. In 2012, 99 % of all eels landed were caught with eel pots, similar to previous years. These eels are believed to be entirely yellow eels.

Total reported commercial eel landings for Maryland in 2012 were 556,093 pounds. This was second only to 2011 as the highest annual total since 1983 when a commercial license was first required to harvest eels (Figure 1). Landings have exceeded the time series mean for eight consecutive years. The linear fit describes a steady increase in landings from 1983 to 2012 ($R^2 = 0.58$).

Monthly reported eel landings in 2012 were bimodal. The spring (March-May) and fall (September- November) fisheries accounted for 51% and 32% of total yearly landings, respectively.

2. Biological data from representative sub-samples.

A total of 422 commercially harvested American eels were sampled from the eel pot fishery in the Choptank River in spring 2012. Eels were procured from the same cooperating Choptank River eeler in 2006 and 2007. All eels were harvested from ½” x ½”

wire mesh eel pots. Sagittal otoliths from 123 sub-sampled eels were extracted for age analysis. Prevalence rate of the nematode swim bladder parasite *Anguillicola crassus* during 2012 in Choptank River eels (N = 80) was 51%, nearly identical to 2006 (47%) and 2007 (50%) and the overall Chesapeake Bay average of 50% from 2004-2012. Females comprised 69% of the 2012 Choptank River sampled, the same as observed in the 2012 Chester River sample. This was also comparable to the 63% female sex composition in the 2006 Choptank River sample. Size distribution of Choptank River eels in 2012 shifted to larger sizes relative to eels sampled from 2006 and 2007 (Figure 2). The mean length of commercially sampled Choptank River eels in 2012 was 380 mm, notably larger than the 340 mm mean from samples in 2006-2007.

A total of 574 commercially harvested American eels were sampled from the eel pot fishery in the Chester River in spring 2012. Eels were harvested with eel pots (½" x ½" wire mesh). Sagittal otoliths from 108 sub-sampled eels were extracted for age analysis. Prevalence rate of the nematode swim bladder parasite *Anguillicola crassus* during 2012 in the Chester River eels (N = 63) was 56%. Females dominated the catch in the Chester in 2012 with a 2.4:1 female to male ratio. Eels from the commercial pot fishery in the Chester River were previously sampled in 2003. Length distributions were markedly different between 2003 and 2012 (Figure 3). In 2012, catches were dominated (68%) by eels from 300-400 mm while eels were more evenly distributed among larger size bins in 2003. The cooperating eeler in 2003 used mixed mesh pots and due to the drastic differences in size distribution, a larger than ½" x ½" mesh may have predominately been used. Therefore, length distribution comparisons among these two years should be viewed with caution. The mean size of 2012 Chester River eels was 354 mm, comparable to the mean size of 364 mm for all commercially harvested eels using the same pot mesh size since 1998.

The total annual mortality rate (A) was calculated by the number at first age of full recruitment (N_0)/ sum of all aged fish recruited ($\sum N$) (Heincke 1913). The total instantaneous mortality rate (Z) was calculated from $Z = -\ln(1-A)$. The instantaneous annual natural mortality rate (M) was assumed to be $3 / T_{max}$ (Anthony 1983), where age 12 is used to represent terminal age of an estuarine eel in Chesapeake Bay. M was therefore calculated to be 0.25. The instantaneous fishing mortality rate (F) was derived as $F = Z - M$. Application of Heincke's method for the Choptank and Chester rivers indicated $F=0.37$ and $F=1.37$ (Table 1). Modal age of commercially harvested eels for the Choptank and Chester rivers was age 2 and age 4, respectively.

3. Estimated percent of harvest going to food versus bait.

Data not available.

c. Estimates of exports by season

Dealers are required to report the weight and price paid for American eels purchased, as well as the weight and price of eels sold, but are not required to report export of eels. Therefore, estimates of exports by season cannot be made with any degree of accuracy.

d. Harvest data provided as CPUE

In 2012, eel pot catch-per unit-effort (CPUE) in state tidal waters was 0.72 pounds per pot. The CPUE has ranged from 0.71-0.86 pounds per pot in seven of the last eight years with the exception in 2006 when CPUE was the highest (1.01) and effort was the lowest in the 21-year time series (Figure 4). Since 1992, both American eel landings and CPUE have shown an overall positive trend. Eel pot effort steadily declined from 1999 through 2009, but increased by more

than 100% by 2011 over the 2009 low (Figure 5). Eel pot effort in 2012 declined slightly from 2011 levels but remained approximately 35 % above the time series mean.

e. Permitted catch for personal use, if available.

In 2012, licensed commercial crabbers harvested 26,964 pounds of American eel for use as trotline bait with a CPUE of 0.83 pounds per pot. Harvest of eels for trotline bait in 2010 and 2011 averaged 82,866 pounds. It was suspected that some larger operation eel pot fisherman reported their harvest through the crab harvest forms instead of the finfish harvester forms. This does not appear to have occurred in 2012 as reported harvest of eels as trotline bait is in line with the 18-year time series mean of 25,404. It should be noted that landings of eel reported from the crab harvester forms are not reported to NMFS.

II. RECREATIONAL FISHERY

a. Synopsis of regulations in place – 2012 season

1. Open Season: All year.
2. Minimum Length: 6 inches total length.
3. Hook and line – Tidal and non-tidal possession limit: 25 daily.
4. A licensee authorized to catch crabs may use up to 10 pots to catch up to 25 eels daily for personal use as crab trotline bait without obtaining an authorization to catch finfish.
5. Recreational fishers who use pots to harvest eels are required to comply with the same pot construction requirements as commercial eel harvesters.

b. Estimate of recreational harvest by season - calendar year 2011

N/A

III. FISHERY-INDEPENDENT MONITORING

a. Results of the annual young-of-year (YOY) abundance survey - spring 2012

An ASMFC mandated survey of young-of-year (YOY) abundance was conducted at Turville Creek, a tributary to the Isle of Wight Bay, in Maryland's coastal bay watershed from 22 February to 20 April for the thirteenth consecutive year. This site, which was sampled using an Irish elver ramp/trap, was fished 36 times over the 9-week period. A total of 283,708 glass eels and elvers were captured over the sampling period with a CPUE of 450.9 elvers/hour, nearly double the previous highest annual CPUE of 247.5 in 2010 (Figure 6). In 2012, and for 5 out of the last 6 years, more than 75% of the YOY have been captured in the first half of the sampling season. The survey was modified to start earlier in each of the last 5 years to ensure sampling would coincide with peak inshore migration of glass eels. The annual American eel YOY index has trended moderately positive since 2006 although it has been quite variable since initiation in 2000.

In spring 2012, YOY sampling was completed at Bishopville prong, a coastal bay tributary to the St. Martin River. Sampling occurred at this site in 2000 and 2001 and was reinstated in 2011. The same gear (Irish elver trap) and sampling methodology utilized at Maryland's primary

YOY site (Turville Creek) was employed at the Bishopville site. The trap was fished 31 times from 28 February to 27 April. A total of 390,768 glass eels and elvers were captured over the entire sampling period for an annual CPUE of 472.9 elvers/hour (Figure 7). These catches were significantly higher than any of the three previously sampled years. The 2012 CPUE was nearly 4 times as large as the CPUE in 2011 and 32 times and 72 times as large as 2000 and 2001, respectively.

b. Description of other fishery-independent surveys and results

1. Sassafras River Eel Pot Survey

A Sassafras River fishery independent eel pot survey, previously conducted from 1998-2000, has been replicated annually since 2006. In 2012, approximately 30 pots were fished on twelve separate days from 23 May to 29 June. Of the 644 American eels collected during this fishery independent survey, sagittal otoliths from 108 sub-sampled eels were extracted for age analysis. Prevalence rate of the nematode swim bladder parasite *Anguillicola crassus* during 2012 in Sassafras River eels (N = 60) was 67%, above the Bay wide average of 50% (2004-2012), but similar to the 65% rate seen in the Sassafras River since 2006. Males outnumbered females for the second consecutive year and comprised 59% of sample. The proportion of males in the Sassafras River has increased 5 out of the last 6 years and has been the only one out of eight Maryland Chesapeake Bay tributaries sampled since 2006 in which males outnumbered females. The 2012 daily CPUE in pounds per pot ranged from 0.13-0.48 with a mean of 0.27, significantly lower than the CPUE in each of the last 3 years, yet still significantly higher than both 1998(0.08) and 1999(0.10) (Figure 8). In 2012, similar to previous years, eels in the 280-340 mm range (72%) dominated catches (Figure 9). Mean length of captured eels in 2012 was 322 mm, a decline from 2006-2011 in which the mean length ranged from 333-342mm. This is largely due to the increase in the proportion of males and a decreased proportion of “large” eels. Modal age of the sampled American eels from the Sassafras River in 2012 was 5 and F=0.76 as indicated by Heinke’s ratio method (Table 1). Until 2012, the modal age in the Sassafras River was age 4 for six consecutive years.

2. Gravel Run Silver Eel Sampling

The annual silver eel survey at Gravel Run, a first order tributary to Corsica River (Chester River watershed), was completed in 2012 for the seventh consecutive year. The trap, a passive gear, was deployed on 27 September and operated continuously with the exception of 3 days during Hurricane Sandy, until the trap was removed on 3 December. It was fished on 20 days throughout the sampling period. A total of 57 silver eels were captured in 2012, 52 of which were captured 28 October, the first night during Hurricane Sandy. This exceeded the previous high annual catch of 37 silver eels that occurred in 2008. A total of 183 silver eels have been captured, sexed, aged, and checked for swimbladder parasite infestation over the seven-year sampling period. Males have comprised 70% of the catch (N = 129) and displayed a mean length and age of 331 mm and 6.0 years (range = 2-11 years), respectively (Figure 10). Females comprised 30 % (N = 54) of the total catch and displayed a mean length and age of 621 mm and 10.4 years (range = 7-14 years), respectively. Prevalence rate of swimbladder parasite *Anquillicolla crassus* for combined sexes since 2006 was 61%. The prevalence rate in 2012 was 63% down from 92% in the previous year.

c. Projects planned for the next five years

1. Mandated YOY abundance survey in Maryland’s coastal bays (Turville Creek) and additional YOY survey at Bishopville Prong.
2. Fishery independent eel pot survey in the Sassafras River.
3. Gravel Run “Silver” eel sampling. Sampling methodology will need to be modified as a result of the removal of the dam planned for 2014.

IV. CHARACTERIZATION OF OTHER LOSSES

There is no data available at this time to quantify other losses.

V. EEL MANAGEMENT PROGRAM FOR THE CURRENT CALENDER YEAR

a. There are no planned changes in eel regulations in 2013.

b. In addition to continuing ongoing fishery independent surveys in 2013, fishery dependent sampling from the commercial eel pot fishery will be completed for the Chester and Susquehanna rivers. In order to characterize the American eel population in Maryland's portion of the Chesapeake Bay, relative abundance, distribution, size, age, sex determination, and parasite infestation rates will be among information collected by these surveys.

Table 1: Estimated age distribution, instantaneous total mortality rate (Z) and fishing mortality rate (F) for the Choptank, Chester, and Sassafras rivers, spring and summer 2012. Instantaneous natural mortality rate (M) = 0.25.

Location	Year	Z	F	Catch at Age (estimated based on age-length key)									
				1	2	3	4	5	6	7	8	9	10
Choptank River	2012	0.62	0.37	15	187	136	44	32	8				
Chester River	2012	1.62	1.37		117	152	245	40	18	3			
Sassafras River	2011 2012	1.01	0.76		7	197	490	524	184	75	17	21	4

Figure 1. Reported American eel harvest from Maryland Chesapeake Bay, 1983-2012.

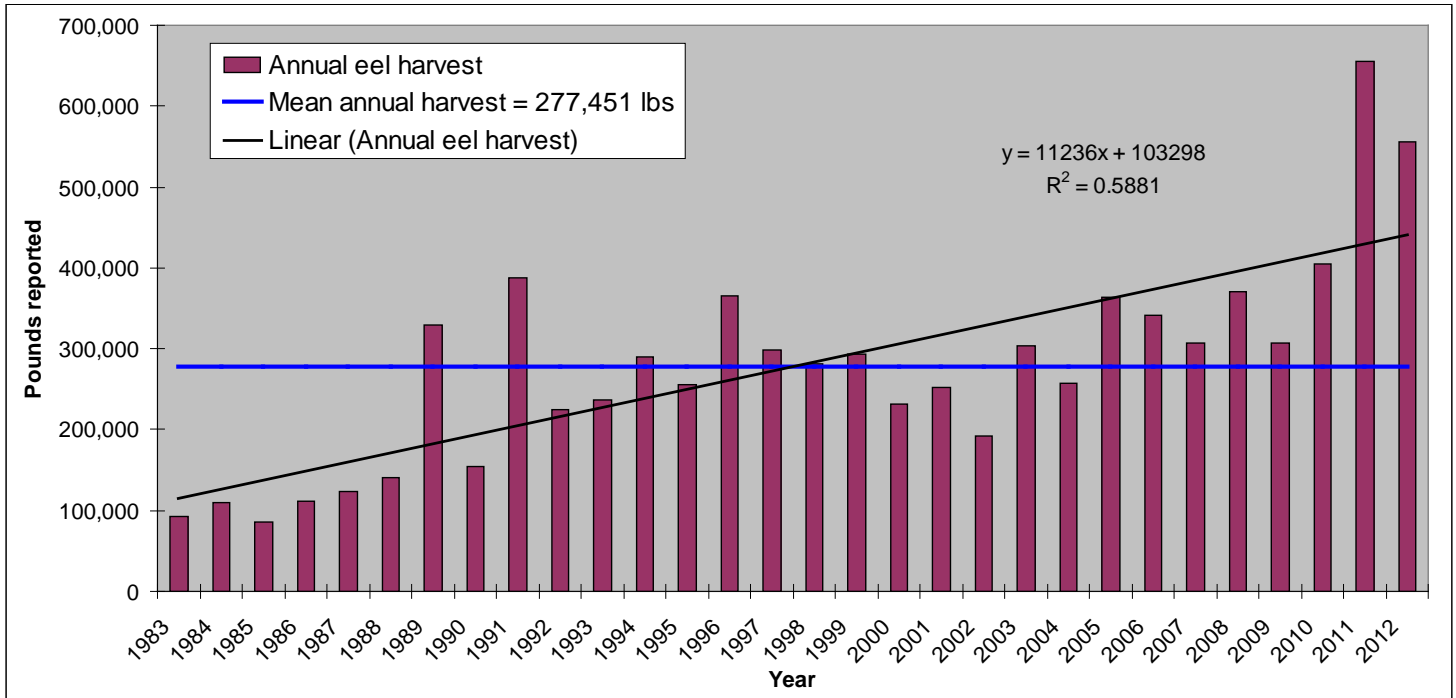


Figure 2. Length distribution of commercially harvested eels from the Choptank River, 2006, 2007, and 2012.

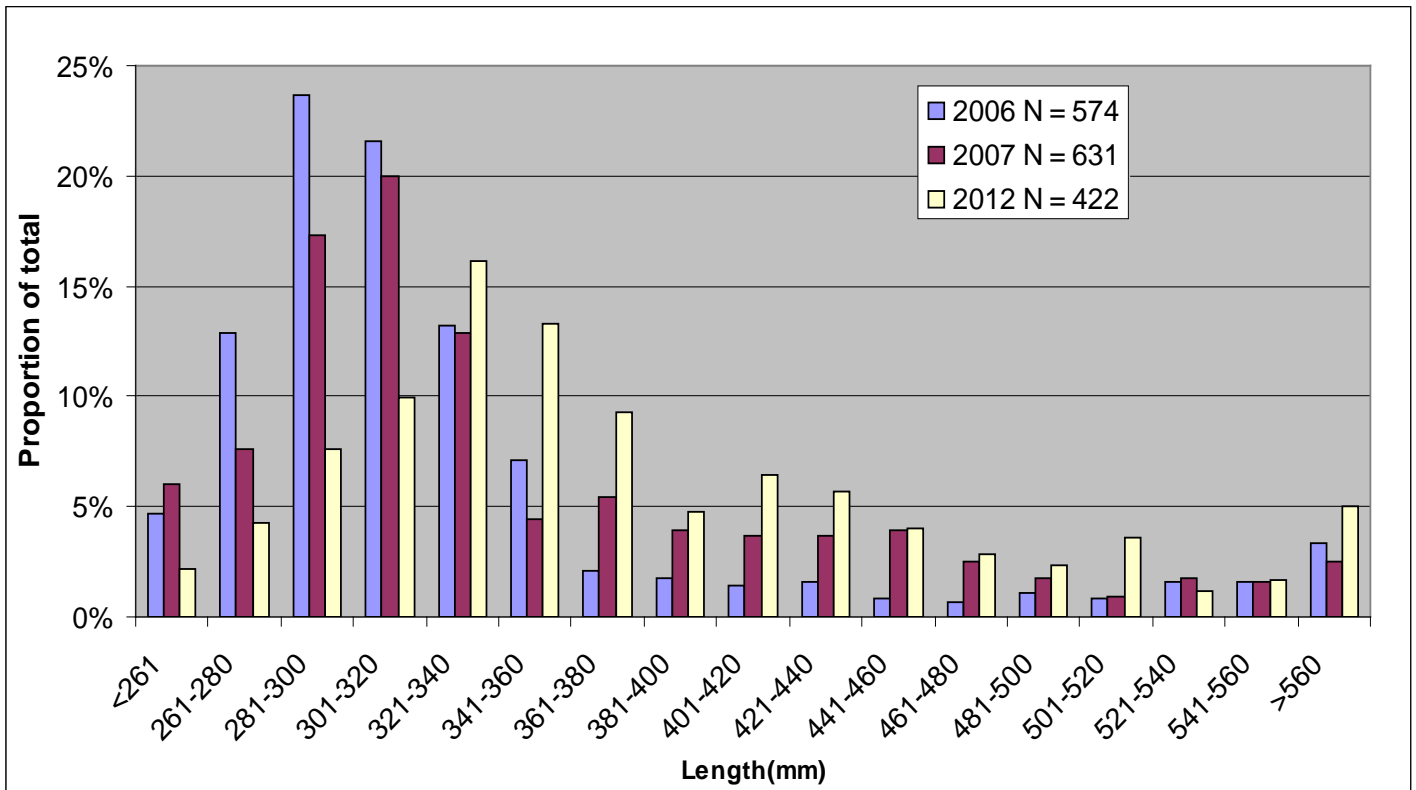


Figure 3. Length distribution of commercially harvested eels from the Chester River, 2003 and 2012.

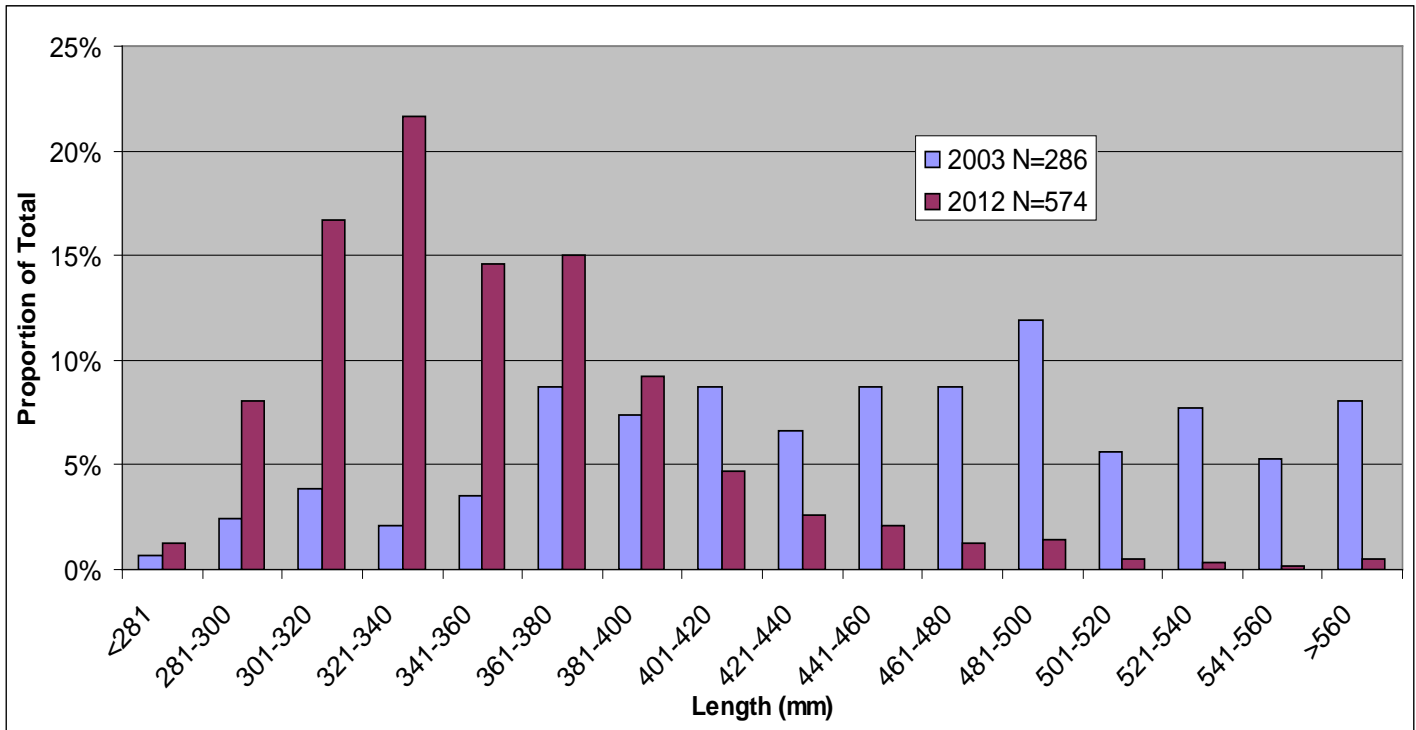


Figure 4. Maryland commercial eel harvest and annual CPUE, 1990-2012.

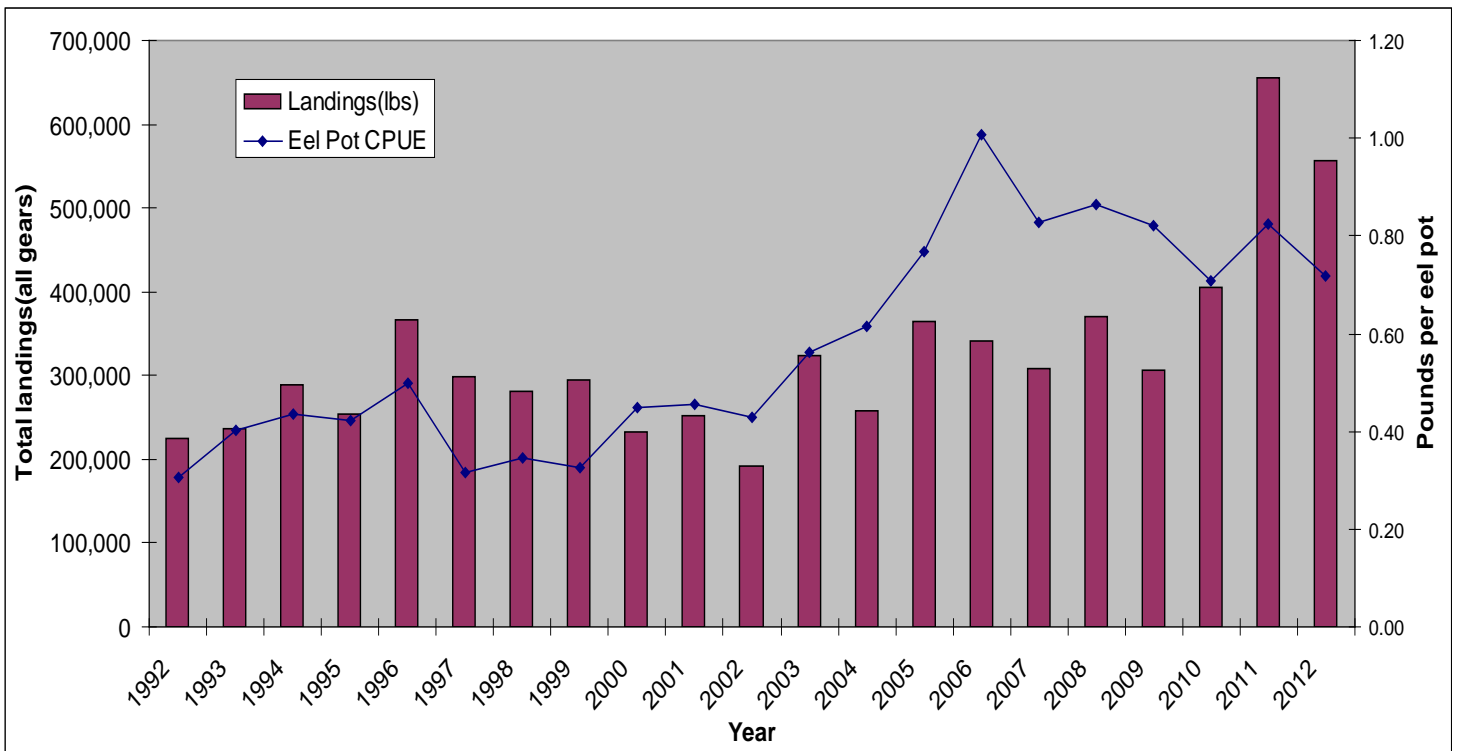


Figure 5. Total annual commercial eel pot effort (eel pots * boat days), 1992-2012.

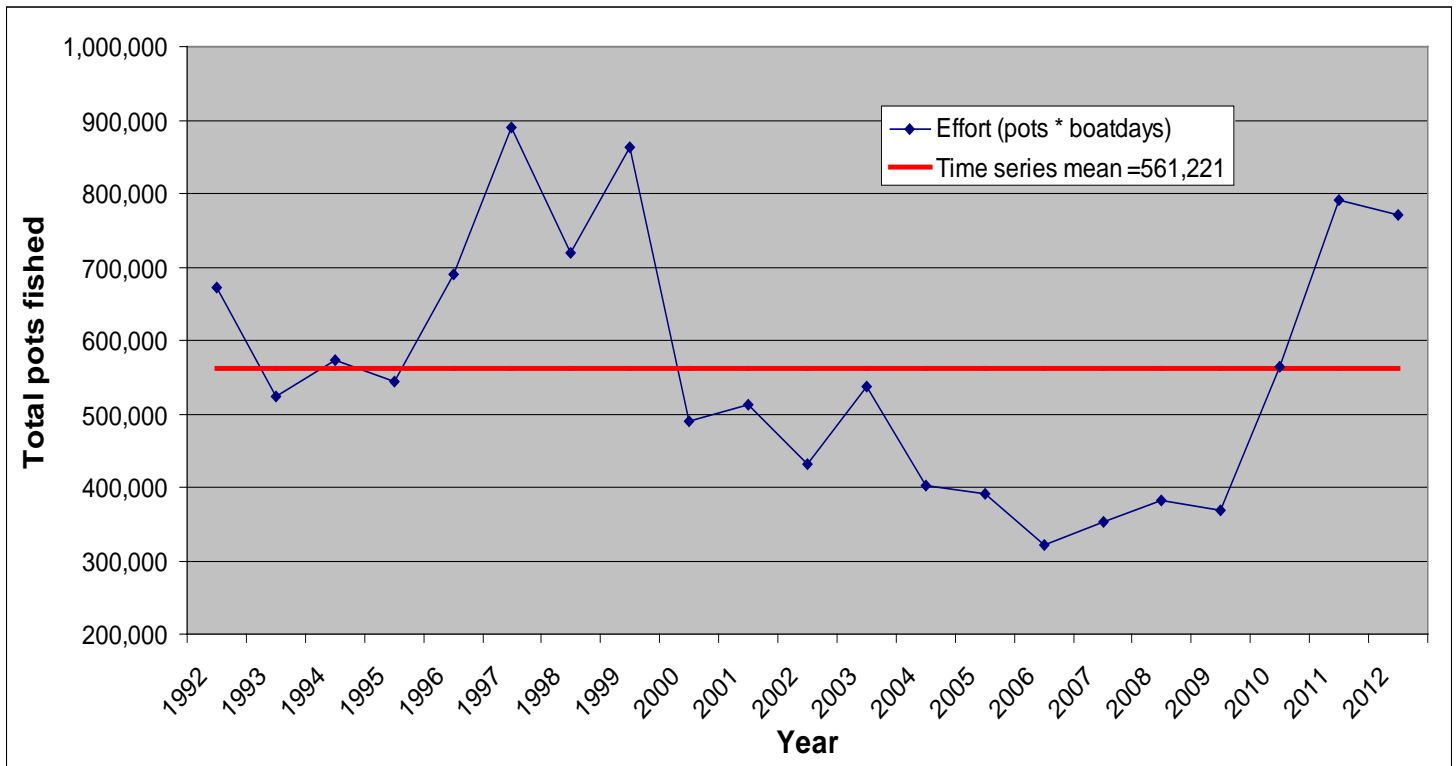


Figure 6. Maryland YOY (Turville Creek) arithmetic mean CPUE index with 95% confidence intervals, 2000-2012.

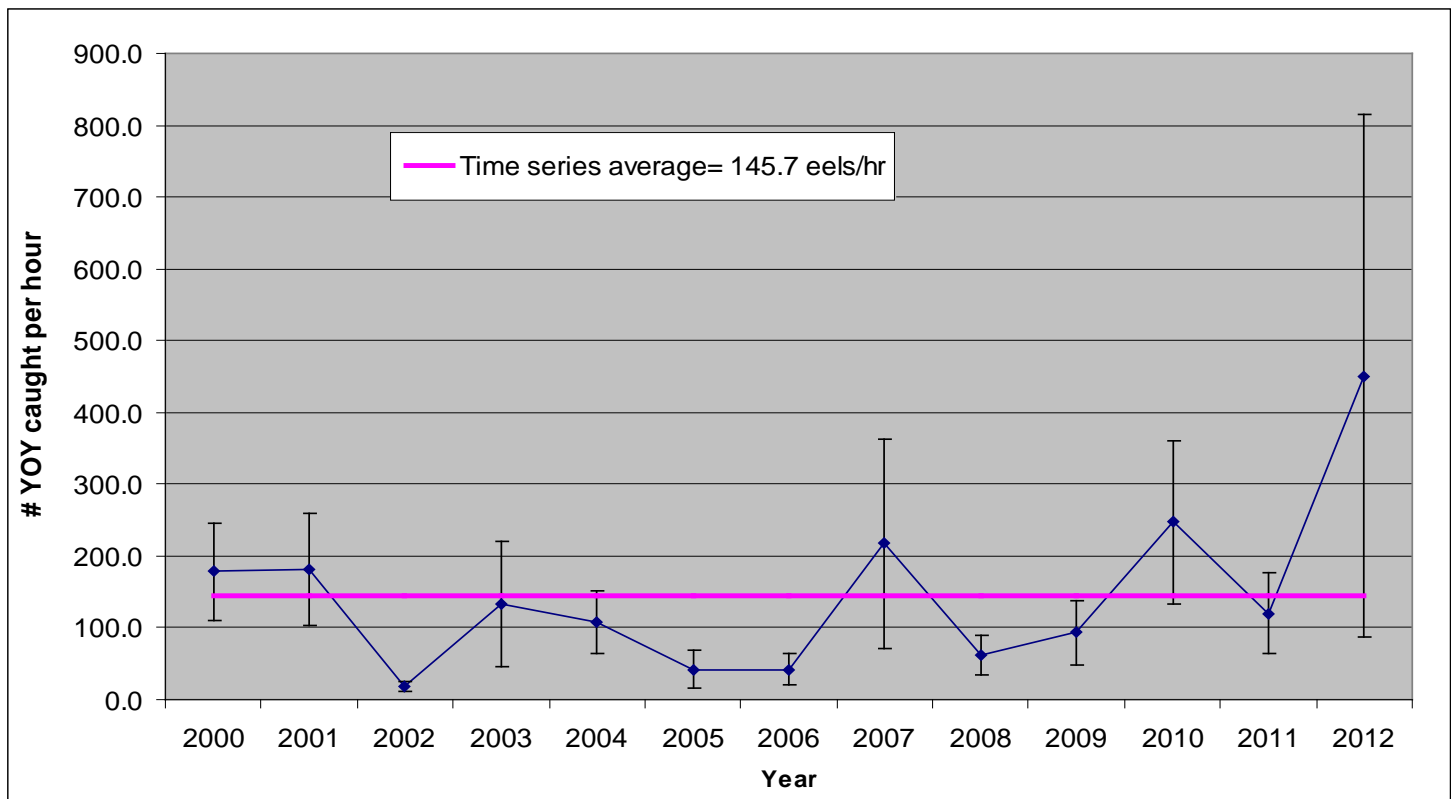


Figure 7. Maryland YOY (Bishopville) arithmetic mean CPUE index with 95% confidence intervals, 2000-2001 and 2011-2012.

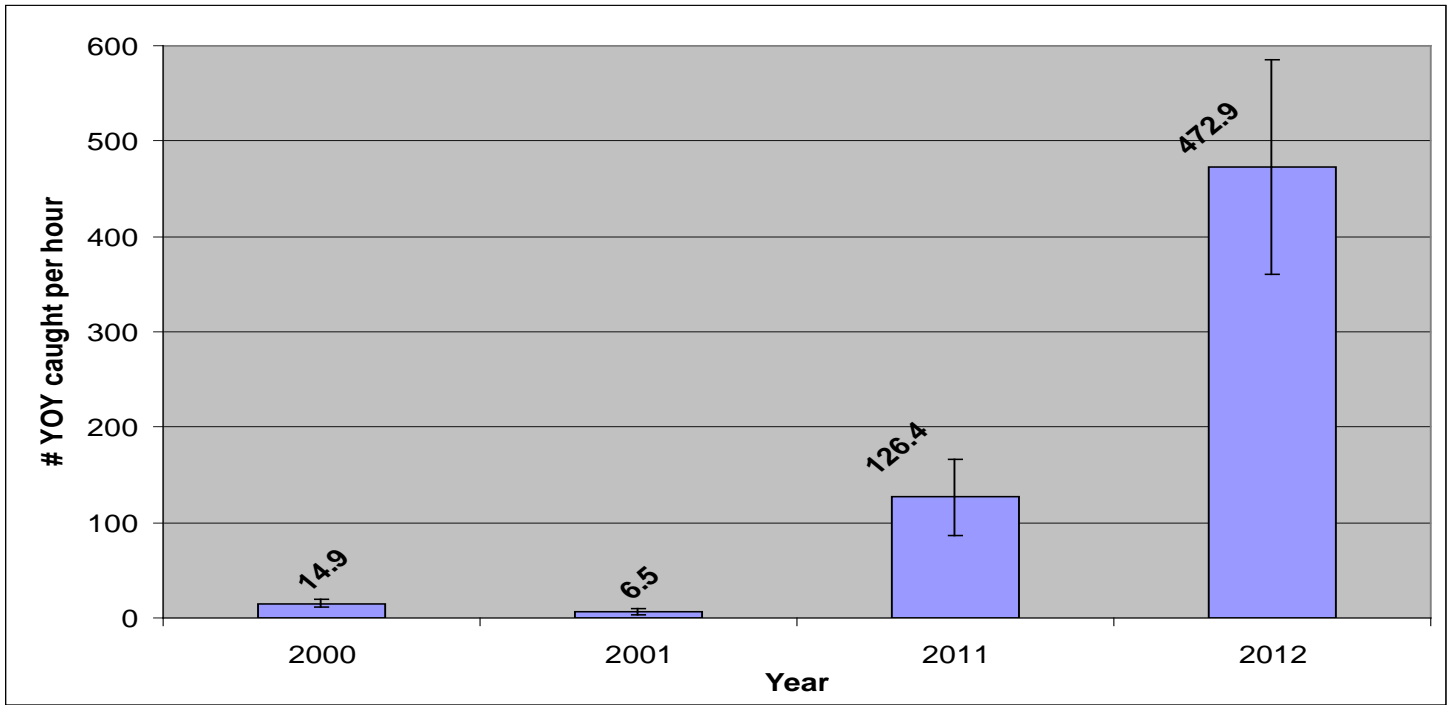


Figure 8. Mean annual CPUE and 95% confidence intervals for fishery independent eel pot survey on the Sassafras River, 1998-2000 and 2006-2012.

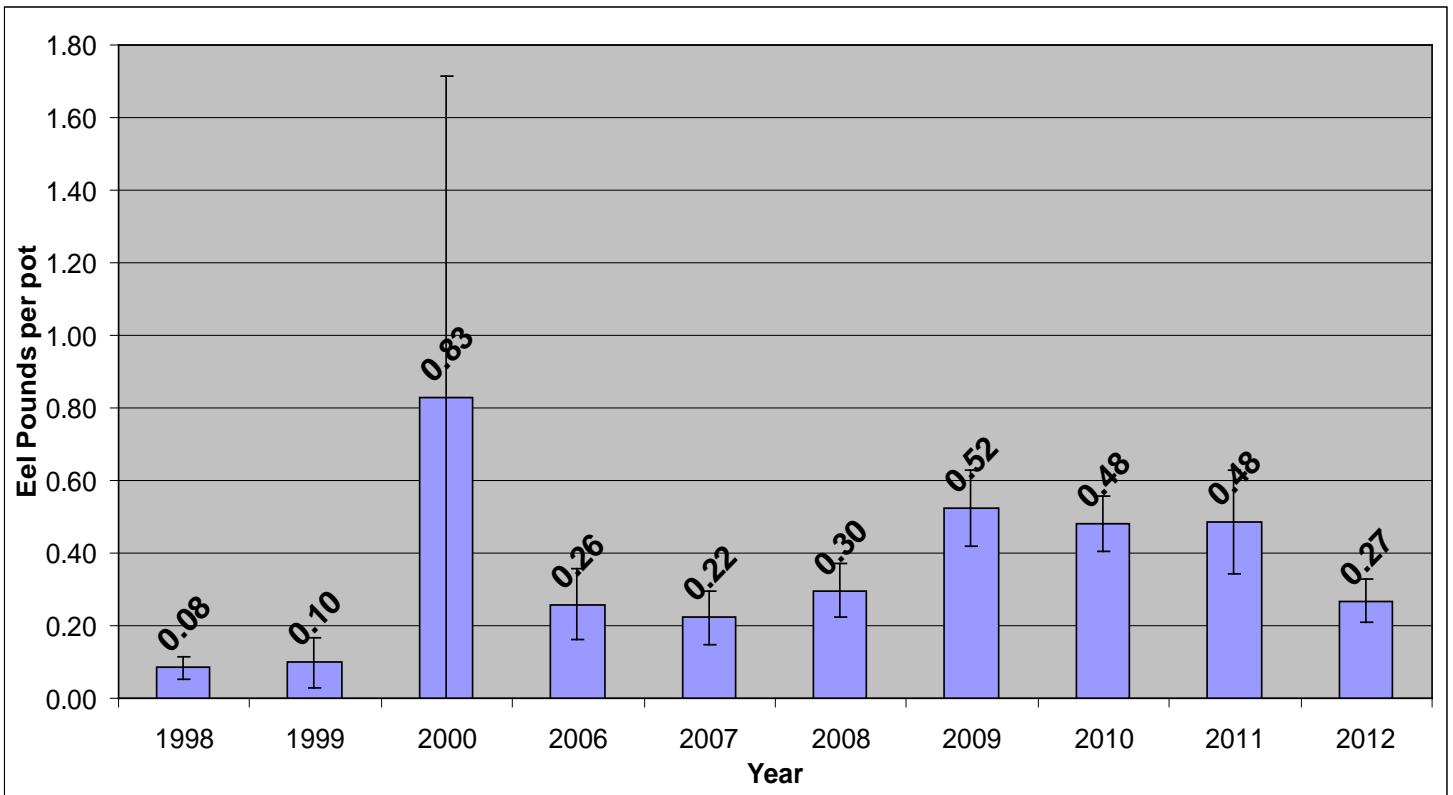


Figure 9: American eel length distributions for the fishery independent eel pot survey on the Sassafras River, 1998-2000, 2006-2011, and 2012.

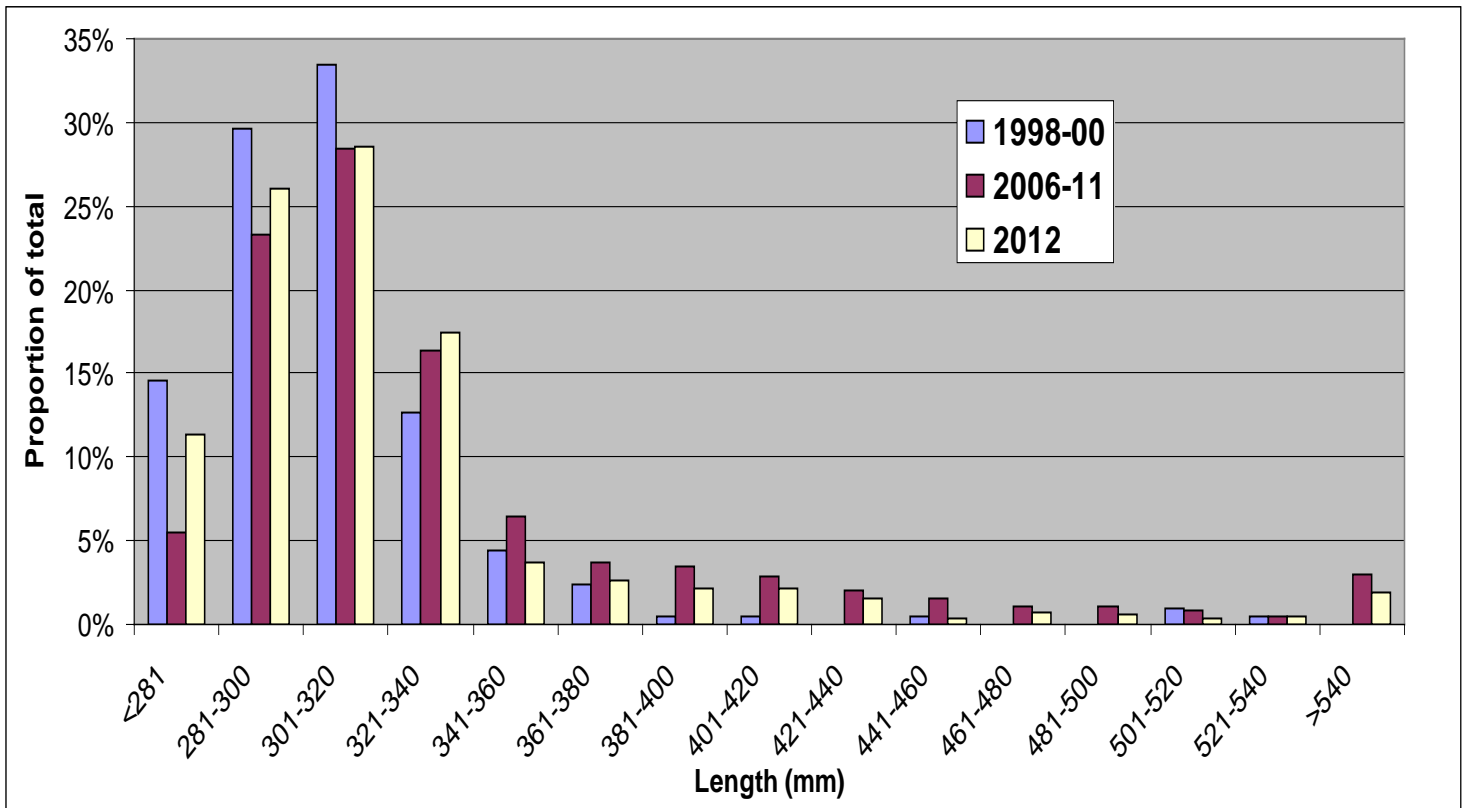
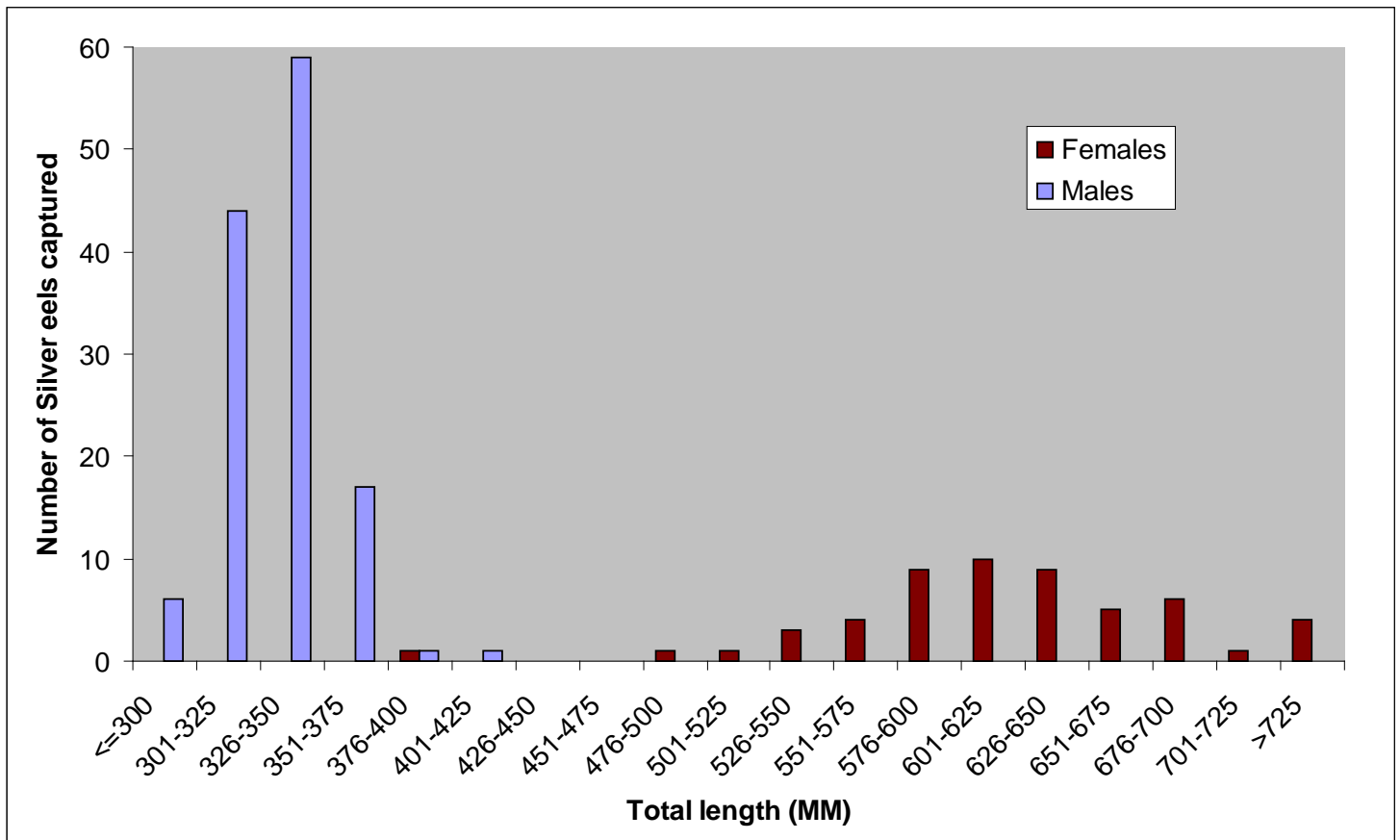


Figure 10: Length distribution of male and female Silver eels captured at Gravel Run, 2006-2012.



*DISTRICT OF COLUMBIA FISHERIES AND WILDLIFE MANAGEMENT DIVISION
2013 ANNUAL STATE COMPLIANCE REPORT FOR AMERICAN EEL*

Fisheries Management Branch

Introduction

Within the District of Columbia's rivers there are many valuable forage and game-fish species, some of recreational and some of commercial interest. One such species is the catadromous American eel *Anguilla rostrata* (Lesueur). This species ascends into freshwater rivers and streams as young eels, known as elvers, then spends its adult life in freshwater before returning to the ocean to spawn. This species, once extremely common, has declined in abundance throughout its range. Locally, this species is used both for bait and human consumption. American eels are routinely encountered while performing our fishery independent surveys.

II. Request for *de minimis*, where applicable.

Previously granted

III. Previous calendar year's fishery and management program

a. Activity and results of fishery-dependent monitoring (provide general results and references to technical documentation).

Not applicable, there is no commercial fishery for eels in the District of Columbia.

b. Activity and results of fishery-independent monitoring (provide general results and references to technical documentation).

This species is routinely captured during resident and anadromous boat electrofishing surveys conducted on the mainstem of the Anacostia and Potomac Rivers, as well as during our backpack electrofishing surveys of Rock Creek, a tributary to the Potomac River. All specimens caught are measured to the nearest millimeter and released.

An elver survey was conducted in 2012 from April into June in order to document species abundance. An electrofishing backpack was used due to the previous ineffectiveness of Irish elver traps in Rock Creek.

c. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

No commercial fishery for eels exists, and recreational anglers may keep up to 10 eels per day as long as they measure six inches.

III. Previous calendar year's fishery and management program

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

No commercial fishery for eels exists in the District of Columbia, and no data on recreational harvest is available.

e. Review of progress in implementing habitat recommendations.

There is no specific program in the District of Columbia to modify American eel habitat. Work implanted for fish passage in Rock Creek, in cooperation with the National Park Service and the Woodrow Wilson Bridge Project, while being designed specifically for passage of anadromous alosids, is also benefiting American eel passage in the Rock Creek watershed.

IV. Planned management programs for the current calendar year.

The management programs and creel/size limits in place since 2003 will continue in 2014.

a. Summarize regulations that will be in effect. (Copy of current regulations if different from III c.)

The regulations in place since 2003 will continue in 2014. Recreational gear may include:

- (A) Five eel traps operating concurrently per recreational angler.
- (B) Traps must have the angler's name, phone number and fishing license number attached by the eel trap operator.
- (C) 10 eels per day may be kept by recreational anglers, as long as they measure at least six inches.

b. Summarize monitoring programs that will be performed.

The District of Columbia's eel survey will continue in 2014. Due to the lack of success achieved with the Irish elver traps set in Rock Creek, we will continue to use alternate techniques to capture elvers such as backpack electrofishing. Eel pots will continue to be placed in the Potomac and Anacostia Rivers to target adult eels. All eels captured are identified (life stage), weighed and measured.

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IV. Planned management programs for the current calendar year.

- c. Highlight any changes from the previous year.**
None.

V. Plan specific requirements

Please see attached format (Table 1) for American eel compliance reporting requirements.

VI. Law enforcement reporting requirements

There are no American eel specific reporting requirements. Regulations enforced include:

(A) No more than five eel traps may be operated concurrently per recreational angler.

(B) An eel trap operator will attach the angler's name, phone number and fishing license number to each trap.

(C) Each angler can keep 10 eels per day, as long as each eel measures at least six inches.

Table 1

**Annual State Report on Regulations, Harvest, Bycatch
and Fishery-Independent Surveys for American Eel**

Each state jurisdiction will be required to submit an annual report (in accordance with Section 5.1.2) detailing that state's regulations, catch, harvest, bycatch, fishery dependent and fishery independent surveys, and characterization of other losses for American eel. The report will address each of the topics listed below.

- 1. Commercial fishery**
 - a. Synopsis of regulations in place**

No commercial fisheries are allowed in the District of Columbia.
 - b. Estimates of directed harvest, by month, by region as defined by the states**
 - 1. Pounds landed by life stage and gear type (defined in advance by ASMFC)**

Not applicable
 - 2. Biological data taken from representative sub-sample include sex ratio and age structure (for yellow/silver eels), length and weight, if available**

Not applicable
 - 3. Estimates percent of harvest going to food versus bait**

Not applicable
 - c. Estimates of export by season (provided by dealers)**

Not applicable
 - d. Harvest data provided as CPUE (by life stage and gear type)**

Not applicable
 - e. Permitted catch for personal use, if available**

Not applicable

Table 1
(Continued)

**Annual State Report on Regulations, Harvest, Bycatch
and Fishery-Independent Surveys for American Eel**

2. **Recreational fishery**
 - a. **Synopsis of regulations in place**

Ten eels per person per day; six inches minimum size limit
 - b. **Estimate of recreational harvest by season (if available)**
 1. **Biological data taken from representative sub-samples to include sex ratio, age structure, length and weight (if available)**

No data on recreational catch has been collected. With no concentrated recreational fishery directed toward American eel identified in the District of Columbia, and no data on preferences of fishing for, or capture of, American eels obtained during our standard creel surveys, we have no recreationally-derived biological data on American eel.
3. **Fishery independent monitoring**
 - a. **Results of the annual young-of-year abundance survey (unless exempt)**

As mentioned earlier backpack electrofishing was performed this year as an alternative. Shocking started on April 4, 2012 and ended June 7, 2012. During that span nine samplings were conducted resulting in 955 eels being caught, of those six were young-of-year (YOY), and 862 were considered to be elvers.
 - b. **Description of other fishery-independent surveys performed (methods, location, etc.) and results (if required in FMP)**

In 2012 the fisheries management branch participated in a study that entailed the assessment of adult American eels. The survey is carried out on the Potomac and Anacostia Rivers, two water bodies within the District of Columbia. The two rivers are tidal and freshwater (0.14 ppt) and approximately 200 miles from the Atlantic Ocean.

Eels are collected using commercial grade eel pots, that are hand made out of fine mesh wire with nylon funnels sewn in them. These pots have a single entrance. Each set contains ten eel pots strung together with two weights at each end to anchor the pots and two buoys at each end so they can easily be retrieved. Four sets of eel pots were set between the two rivers. Pots are set on Mondays, checked and re-baited on Wednesdays and checked and retrieved on Fridays. At each station collected eels are measured and weighed. Sampling is repeated during the

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months of May, July, and September. Razor clams are used as bait.

Sampling for adult eels on the main rivers started on May 4, 2012 and ended September 28, 2012 alternating each month for a total of twelve weeks. A total of 62 eels were caught. Eels caught ranged from 170 to 735 mm in length and all were considered to be yellow eels.

c. Projects planned for next five years

- Determine the most effective method for collecting eels and elvers within the District of Columbia.
- Investigate the feasibility of beginning a cooperative passive integrated transponder (PIT) tagging program to track movement of adult American eels within the District of Columbia as well as the entire Potomac drainage.

Table 1
(Continued)

**Annual State Report on Regulations, Harvest, Bycatch
and Fishery-Independent Surveys for American Eel**

4. Characterization of other losses

To the extent possible, states/jurisdictions should attempt to characterize the losses of American eel in number and weight, by life stage or age, due to factors other than commercial and recreational fisheries. Such losses may include, but are not limited to the following.

- a. Impingement / entrainment mortalities of eel at power generation facilities, water intakes, and navigation locks**
No data available
- b. Bycatch mortalities in commercial and recreational fisheries**
No data available
- c. Confiscated poundage from illegal or undocumented fisheries (i.e., poaching)**
No data available
- d. Scientific losses (i.e., samples collected for contaminants analysis, other studies)**
None
- e. Mass mortalities of eels due to disease spills or other causes**
No fish kills or major spills were reported, some limited mortality of American eels may have occurred, but no significant numbers were recorded.

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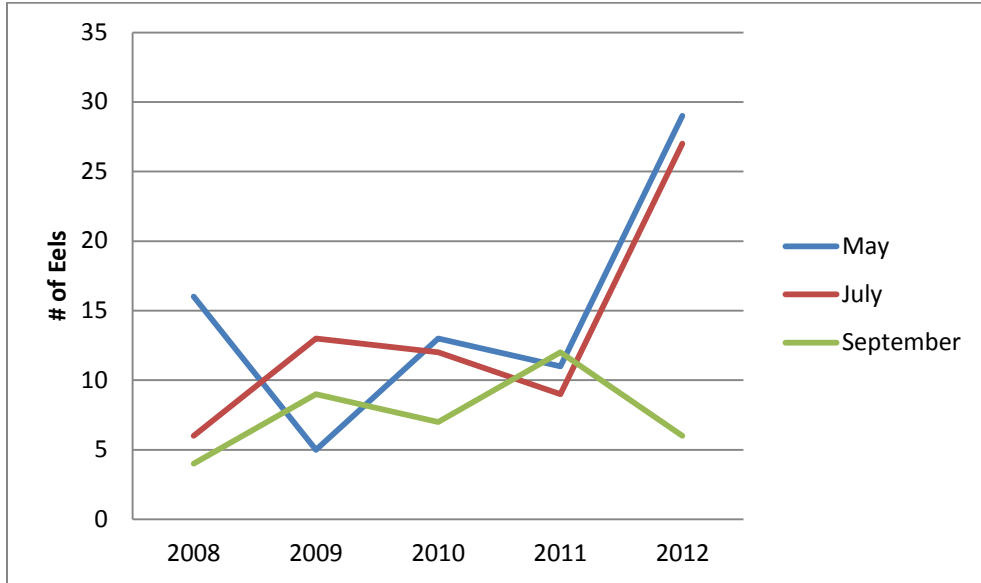


Figure 1 – Adult eels captured in pots, by month

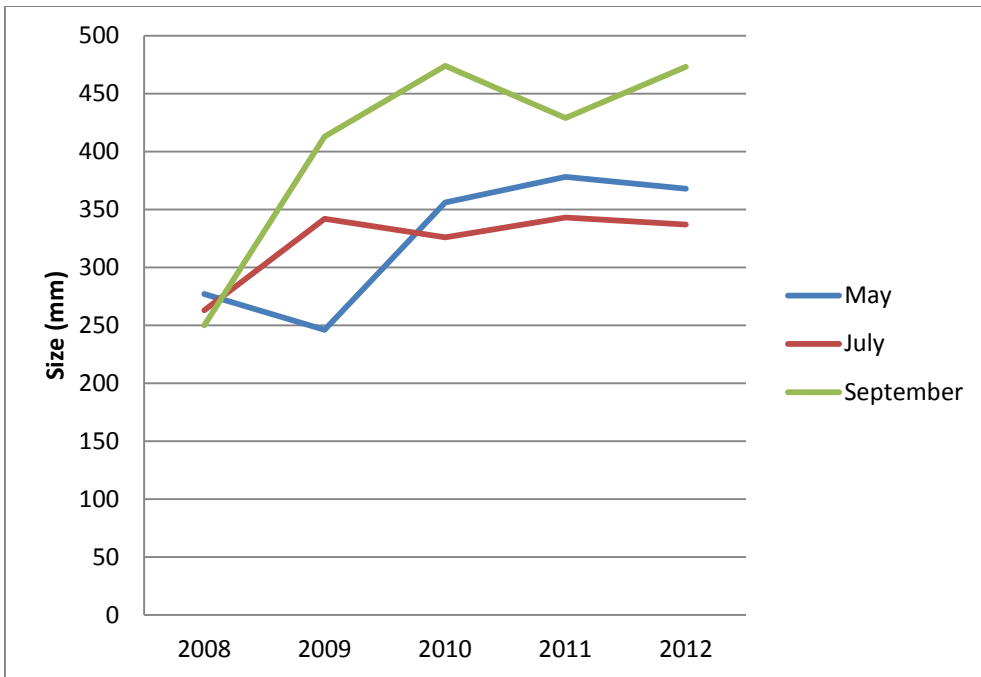


Figure 2 – Adult eel average length, by month

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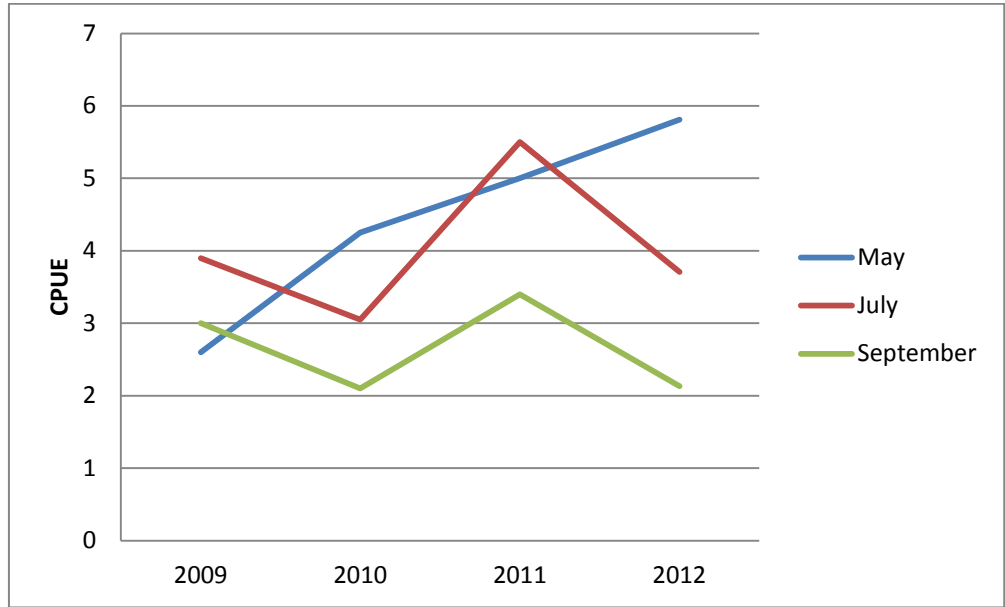


Figure 3 – Elver average catch per unit effort (CPUE) (elvers caught per minute), by month

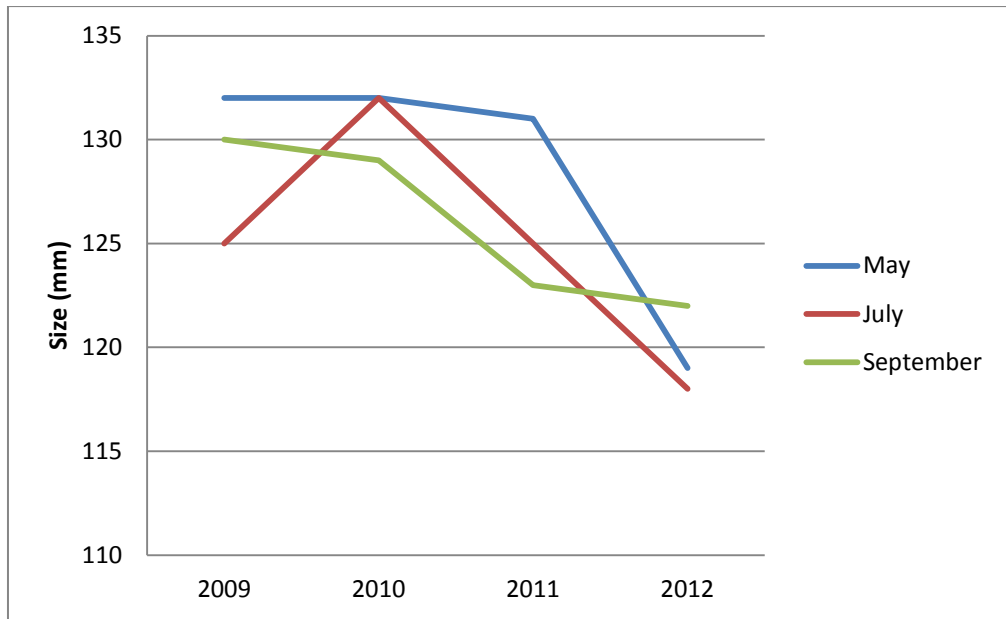


Figure 4 – Elver average length, by month



MARYLAND - VIRGINIA
"Potomac River Compact of 1958"

Potomac River Fisheries Commission

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Colonial Beach, Virginia 22443

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American Eel **2012 Annual State Report** June 1, 2013

I. Commercial Fishery

A. Synopsis of regulations in place

Eel pots are the primary commercial gear used to harvest eels. Pound net, haul seine and several miscellaneous gear types can occasionally contribute to the total eel landings. Each commercial fisherman is required to file detailed daily harvest reports for each gear type used. A commercial license registration fee (\$50) and a commercial eel pot license (\$95 per boat) are required. The minimum size limit is six (6) inches with an open season of January 1 through December 31. There is no commercial catch limit. There is a gear restriction such that no eel pot shall exceed ten (10) feet in length or have a mesh size less than ½ inch by ½ inch.

In 2011, it became mandatory for pound netters to properly install six PRFC approved fish cull panels in the sides of their pound nets. Studies have shown that small fish are released alive when the fish cull panels are used.

B. Estimates of directed harvest

(1) Pounds harvested

American eel harvest from the Potomac River in 2012 totaled 90,037 pounds. This estimate is from the PRFC's mandatory commercial daily harvest reporting program. The 2012 harvest tripled from the 2011 harvest, which was the lowest value since our records began in 1964. The CPUE for the eel pot fishery also increased. In addition to collecting harvest, the mandatory reporting system also collects discards or releases. In 2012, a total of 185 pounds of American eel were reported as released by commercial fishermen (59 lbs. no market, 11 lbs. too small, 115 lbs. too large). The pound net fish cull panels in pound nets release eel before the net is fished; therefore an unknown amount of eel were released/escaped from the net and were not reported.

(2) Biological data - None available

(3) Estimation of Markets

Based on data supplied by the harvesters, about 50% of the harvest went to live markets (food) and 50% were sold or used as bait.

C. Estimates of export by season – No information available

D. Harvest data provided as CPUE

The Potomac River main-stem, the area under the PRFC jurisdiction, has no areas where glass eels or elvers are known to congregate and the ½" by ½" minimum mesh size

in pots precludes the harvest of very small eels. Some lesser part of the total harvest may be silver eels taken in the late fall, but the majority of the Potomac harvest are yellow eels.

Eel pot effort is expressed as “pot days” which is one pot fished one day. Pound net effort is expressed as “net days” which is one pound net fished one time (net-days fished). Effort data by gear type is found in Table #4 and presented in Figure #2 for eel pots.

E. Permitted catch for personal use

All eels caught with commercial gear, either sold or kept for personal use, must be reported on forms supplied by PRFC and the data included in the reported harvest.

II. Recreational fishery

A. Synopsis of regulations in place

Regulations include a six (6) inch minimum size limit, an open season of January 1 through December 31 and a catch limit of fifty (50) per person per day.

B. Estimate of recreational harvest by season

(1) Biological data – None available

(2) Harvest data

The PRFC purchases ‘add-ons’ to the MRFSS phone survey. Any recreational eel harvest would be found within the MD and VA combined MRFSS estimate for the Chesapeake Bay its tributaries.

III. Fishery independent monitoring

A. Results of the Annual Young-of-Year Abundance Survey

The annual elver/young-of-year survey is performed, under contract for the PRFC, by the Department of Fisheries Science, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia. See Table #5 – *Comparison of Potomac River Catch Statistics for the Irish Eel Ramp by year*. In 2007, computation of CPUE was modified, following a request by ASMFC. Glass eel and elver CPUEs at each site were standardized to a 24 hour soak time for the Irish eel ramp, and geometric means were calculated using the time period in which 95% of the cumulative total catch was sampled (i.e. dates in which 0 - 2.5% and 97.5 - 100% of the cumulative total catch was collected were excluded), in an effort to account for the interannual variability in the period of maximum recruitment. CPUEs for each of the previous sampling years were recalculated using the aforementioned method.

In 2010, the CPUE geometric means were replaced by Area-Under-the-Curve (AUC) indices. The AUC were calculated for each site, and were standardized to a 24-hour soak time. The AUC method was used because the 95% geometric mean index calculation method was sensitive to the daily recruitment pattern. For example, if 1,000 elvers arrived at one site in three days and 1,000 elvers arrived at a second site over

the course of 30 days, the 95% geometric mean index would be different for each site even though the number of elvers at each site was identical. The AUC method would provide the same index regardless of how long it took the elvers to arrive, which for glass eels is the ultimate goal. CPUEs for each of the previous sampling years were recalculated using the AUC method.

Results for 2012 indicated above average recruitment of glass eels occurred at Gardy's Millpond and the highest ever recruitment index was observed at Clark's Millpond. Recruitment of elvers remained consistent at each site with more elvers observed at Gardy's Millpond than at Clark's Millpond. A strong recruitment pulse of late-pigment stage glass eels occurred at Clark's Millpond in June. Recruitment of glass eels at these sites consists of more developed glass eels compared with stations located closer to the mouth of Chesapeake Bay. The Potomac River sites are the furthest inland elver/young-of-year survey sampling sites on the East Coast. Recruitment estimates from these two sites display consistency (low variation) through time, a characteristic that will enhance detection of change.

B. Description of other fishery-independent surveys performed (methods, location, etc.) and results. - None

C. Projects planned for next five years.

Given the very high sampling effort and cost required to perform the elver/ Y-O-Y survey, the highly variable and relatively low numbers of eels found and our distance from the coast, we question the efficacy of continuing this survey.

IV. Characterization of Other Losses

No Potomac River specific poaching or hook and release mortality is available. However, regulations are so liberal that poaching would not be expected and we suspect hook and release mortality is high.

V. Tables and Figures

Table 1	Commercial American Eel Harvest by Month
Table 2	Commercial American Eel Landings by County and State
Table 3	Potomac River Commercial Harvest of American Eel from 1964 through the reporting year.
Table 4	Commercial Data by Gear Type
Table 5	Comparison of Potomac River Annual Catch Statistics for Irish Eel Ramp: A. Glass Eels B. Elvers
Figure 1	Commercial American Eel Harvest by Year
Figure 2	Commercial American Eel Data

Table 1

Potomac River - American Eel Commercial Harvest (pounds)

	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
2000		15,272	54,914	30,499	2,308	27,943	27,775	24,714	21,851	3,151	122	208,549
2001		2,317	22,725	63,663	38,814	24,238	16,142	21,812	20,567	3,162		213,440
2002		5,284	23,337	24,226	18,989	15,501	12,248	13,432	11,820	3,753	5	128,595
2003			3,675	20,241	21,539	11,918	14,900	24,194	16,772	9,516	695	123,450
2004		110	4,521	11,046	8,067	18,238	16,548	23,242	26,010	8,475	6	116,263
2005			4,334	8,225	12,104	12,406	15,793	20,725	24,068	5,972	1	103,628
2006		152	1,145	4,016	14,474	22,287	14,034	11,083	11,675	4,752	4	83,622
2007			1,849	13,082	18,518	17,669	14,662	12,224	15,466	3,886	5	97,361
2008		80	1,273	7,206	17,908	14,002	11,682	8,067	5,575	5,846	16	71,655
2009		22	1,145	4,797	15,909	16,031	12,516	5,216	3,216	11		58,863
2010		40	4,718	14,692	10,444	373	6,949	15,345	4,806	326	62	57,755
2011		84	2,603	13,556	7,270	1,932	375	126	2,418	636	10	29,010
2012	45	367	19,334	18,747	14,384	11,191	1,585	10,476	9,985	3,923		90,037
	91	66,755	574,994	1,112,551	696,746	373,390	237,948	388,677	507,358	92,936	2,407	4,053,853
Average		2,373	11,198	18,000	15,441	14,902	12,708	14,666	13,402	4,188	93	106,325

Table 2

**Commercial Eel Landings by County and State
Potomac River – 2012**

<u>County</u>	<u>State</u>	<u>Pounds</u>	
Charles	MD	35,652	
St. Mary's	MD	34,456	70,108
King George	VA	3,141	
Northumberland	VA	949	
Prince William	VA	104	
Stafford	VA	3,613	
Westmoreland	VA	<u>12,122</u>	19,929
Total			90,037

Table 3

Potomac River Commercial Eel Harvest

<u>Year</u>	<u>Pounds</u>	<u>Year</u>	<u>Pounds</u>	<u>Year</u>	<u>Pounds</u>
1964	162,556	1981	262,251	1998	209,008
1965	288,776	1982	316,667	1999	163,351
1966	216,678	1983	359,290	2000	208,549
1967	331,661	1984	483,274	2001	213,440
1968	316,200	1985	291,971	2002	128,595
1969	354,421	1986	355,075	2003	123,450
1970	270,730	1987	322,573	2004	116,263
1971	199,966	1988	233,817	2005	103,628
1972	387,581	1989	299,845	2006	83,622
1973	119,814	1990	238,939	2007	97,361
1974	132,880	1991	202,960	2008	71,655
1975	297,978	1992	166,555	2009	58,863
1976	291,655	1993	238,923	2010	57,755
1977	292,543	1994	322,192	2011	29,010
1978	511,311	1995	199,836	2012	90,037
1979	654,184	1996	231,915		
1980	332,610	1997	164,284		

Table 4

**Commercial Data by Gear Type
Potomac River – 2012**

<u>Gear</u>	<u>Days Worked</u>	<u>Effort</u>	<u>Pounds</u>
Eel Pot	546	59,432 pot days	89,068
Pound Net	90	154 net days	949
Miscellaneous	6	6 gear days	20

Table 5

**Comparison of Potomac River Catch Statistics for the Irish Eel Ramp by year
Potomac River (2000 – 2012)**

A, Glass Eels

Source	Year	Start Date	End Date	Total Catch	AUC* CPUE
Clark's Mill Pond	2000	28-Apr	15-May	15	23.74
	2001	9-Apr	22-Apr	4	4.05
	2002	1-Apr	27-Apr	115	115.79
	2003	25-Apr	15-May	24	40.21
	2004	21-Apr	27-May	447	468.93
	2005	13-Apr	26-May	223	295.78
	2006	6-Apr	22-May	80	90.53
	2007	26-Apr	1-Jul	435	470.33
	2008	14-Apr	19-Jun	22	31.98
	2009	6-Apr	11-Jun	42	42.68
	2010	19-Mar	21-Jul	421	389.06
	2011	16-Mar	21-Jun	46	104.51
	2012	23-Feb	16-Jul	419	495.38
Gardy's Mill Pond	2000	16-Apr	27-Apr	291	286.85
	2001	8-Apr	24-Apr	729	730.25
	2002	29-Mar	25-Apr	129	129.50
	2003	7-Apr	13-May	71	70.01
	2004	2-Apr	18-May	39	38.86
	2005	28-Mar	5-May	94	102.68
	2006	17-Mar	11-May	46	45.39
	2007	23-Apr	27-Jun	248	260.09
	2008	20-Mar	11-Jun	187	178.94
	2009	30-Mar	3-Jun	231	229.92
	2010	19-Mar	21-Jul	90	80.25
	2011	16-Mar	21-Jun	35	36.78
	2012	23-Feb	16-Jul	261	259.83

*AUC – annual Area-Under-the-Curve CPUE indices

Table 5

**Comparison of Potomac River Catch Statistics for the Irish Eel Ramp by year
Potomac River (2000 – 2012)**

B. Elvers

Source	Year	Start Date	End Date	Total Catch	AUC* CPUE
Clark's Mill Pond	2000	5-Apr	15-May	5	10.69
	2001	19-Mar	10-May	205	253.67
	2002	13-Mar	21-Apr	90	90.95
	2003	17-Mar	8-May	225	237.72
	2004	2-Apr	23-May	314	316.36
	2005	28-Mar	24-May	62	62.33
	2006	15-Mar	24-May	153	195.68
	2007	15-Mar	27-Jun	90	90.31
	2008	24-Mar	15-Jun	276	289.16
	2009	30-Mar	31-May	90	90.46
	2010	19-Mar	21-Jul	208	209.59
	2011	16-Mar	21-Jun	84	114.09
	2012	23-Feb	16-Jul	268	256.69
Gardy's Mill Pond	2000	16-Apr	15-May	15	16.46
	2001	16-Mar	1-May	624	660.76
	2002	15-Mar	27-Apr	273	277.15
	2003	19-Mar	6-May	300	300.78
	2004	10-Mar	11-May	483	476.76
	2005	23-Mar	17-May	313	330.15
	2006	10-Mar	14-May	692	827.71
	2007	15-Mar	27-Jun	198	198.23
	2008	20-Mar	11-Jun	393	385.88
	2009	30-Mar	2-Jun	360	358.27
	2010	19-Mar	21-Jul	375	317.53
	2011	16-Mar	21-Jun	507	527.09
	2012	23-Feb	16-Jul	411	406.59

*AUC – annual Area-Under-the-Curve CPUE indices

Figure 1

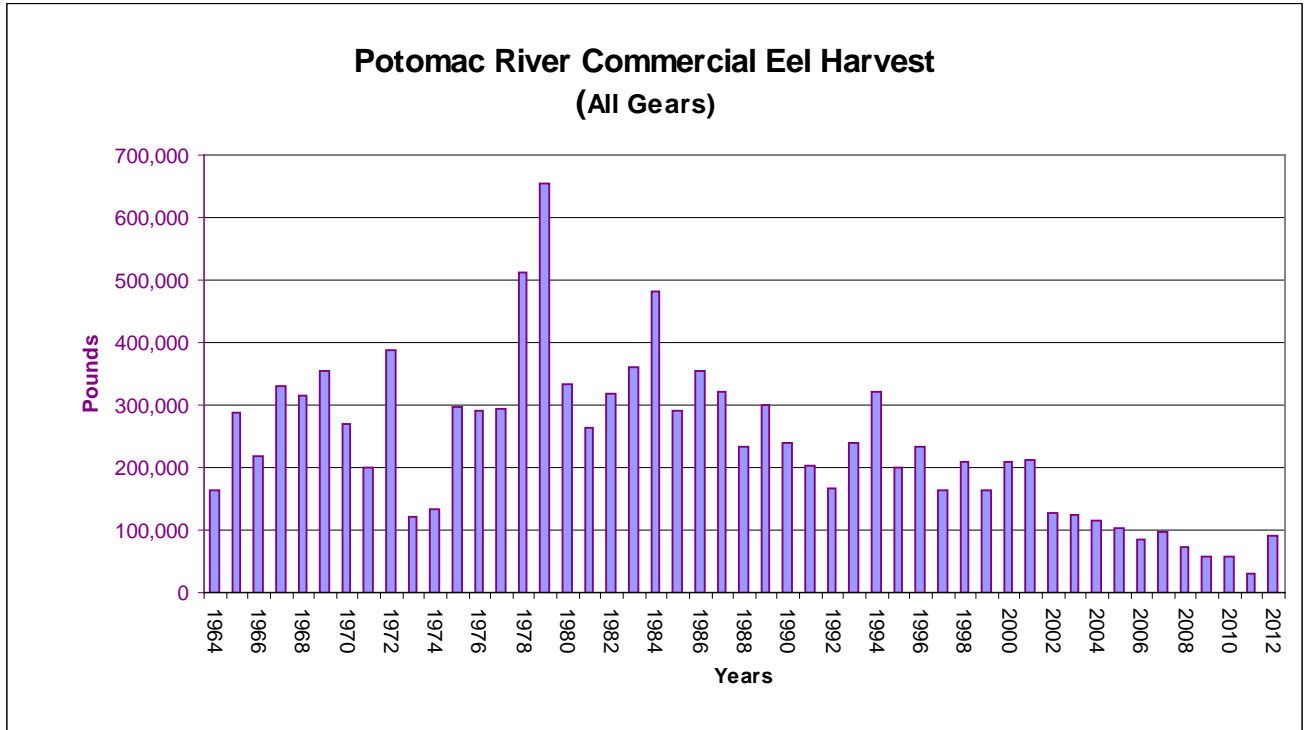
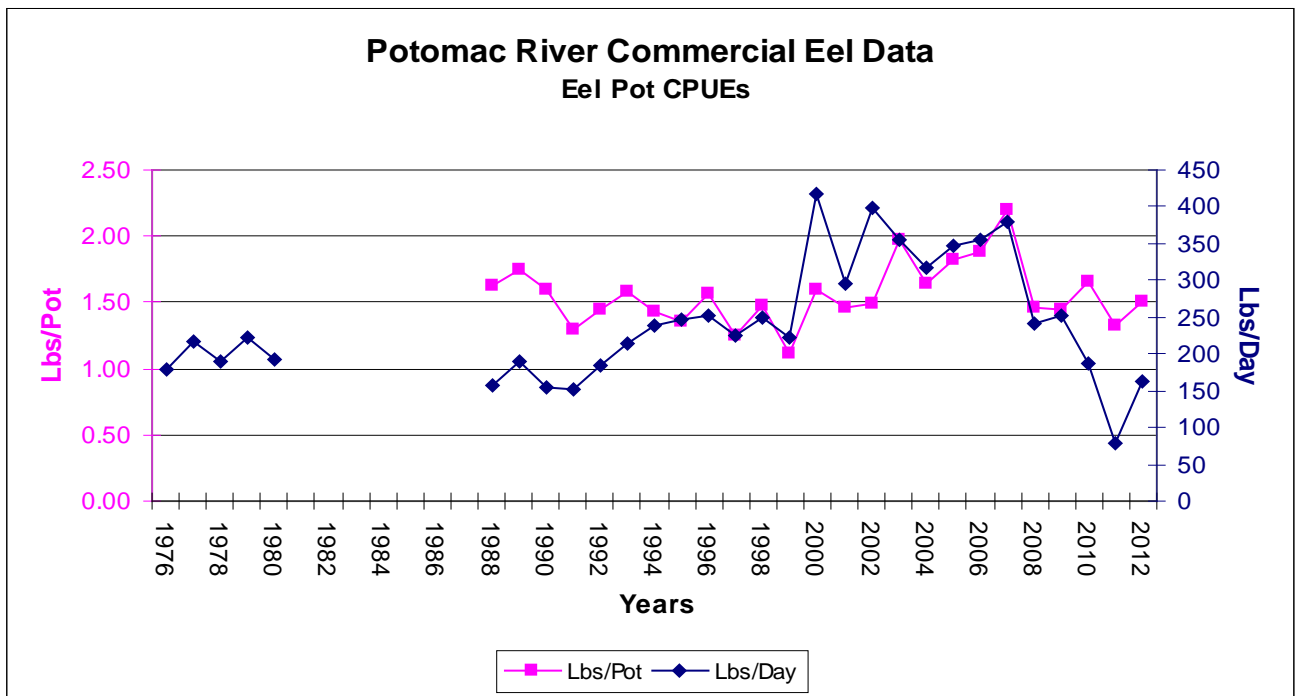


Figure 2





COMMONWEALTH of VIRGINIA

*Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607*

Douglas W. Domenech
Secretary of Natural Resources

Jack Travelstead
Commissioner

September 1, 2013

MEMORANDUM

TO: Kate Taylor, American Eel Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission

FROM: Adam B. Kenyon, Virginia Representative
American Eel Technical Committee

SUBJECT: Virginia's 2013 Compliance Report for American Eel

The attached document describes Virginia's American eel data and fisheries management program for the 2012 calendar year.

Please contact me at 1-757-247-2244 if you need additional information regarding this report.

ABK

Attachment

An Agency of the Natural Resources Secretariat

www.mrc.virginia.gov

Telephone (757) 247-2200 (757) 247-2292 V/TDD Information and Emergency Hotline 1-800-541-4646 V/TDD

AMERICAN EEL COMPLIANCE REPORT

I. Commercial fishery

A. Synopsis of regulations in place

A copy of Chapter 4 VAC 20-500-10 et seq., “Pertaining to the Catching of Eels”, that was in effect for 2012 is provided in Appendix I.

The commercial fishery for American eel is subject to a six-inch minimum size limit. A license is required to harvest finfish for commercial purposes by fish or eel pots, and there are several license categories, each with a fee depending on the number of pots fished. The minimum mesh size allowed in eel pots is ½-inch by ½-inch. Rectangular, square, or cylindrical eel pots must contain at least one unrestricted 4-inch by 4-inch escape panel consisting of ½-inch by 1-inch mesh. The use of any type of fixed fishing device, fish pot, or eel pot in an area extending 250 yards from either span of the Chesapeake Bay Bridge Tunnel is unlawful.

All vessels landing seafood in Virginia for commercial purposes must possess a Seafood Landing License, unless the vessel owner is a Virginia commercial fisherman with a valid Commercial Fishing Registration License. All registered licensees are required to report daily harvest from Virginia tidal and federal waters to the Virginia Marine Resources Commission (VMRC) on a monthly basis. All licensed seafood buyers are required to use a certified scale for determining the weight of fish, shellfish, or marine organisms that are regulated by a harvest weight limit or quota, possession weight limit, or landing weight limit.

B. Estimates of directed harvest, by month, by region as defined by the states

1. Pounds landed by life stage and gear type (defined in advance by ASMFC)

Commercial fisheries data were obtained from the VMRC’s Mandatory Harvest Reporting Database. Information on life stage is not available, but the commercial fishery is dominated by eel pots directed at yellow eels. In 2012, commercial fisheries landed 141,232 pounds of American eels in Virginia. Of this total, an estimated 131,743 pounds of American eels were harvested from Virginia waters (Table 1).

The largest amount of Virginia’s in-state harvest was from the Rappahannock River, accounting for 24% of the eels harvested from state waters in 2012 (Figure 1). Commercial harvest peaked during the late fall (September–October) and this time period accounted for 58% of the in-state harvest in 2012. A second, smaller peak was observed in April–June and accounted for 24% of the 2012 commercial in-state harvest (Figure 2).

2. Biological data taken from representative subsamples to include sex ratio and age structure (for yellow/silver eels), length and weight if available

The VMRC's Biological Sampling Program collects biological data from Virginia's commercial and recreational fisheries. While American eels are not one of the program's target species, commercial samples are collected opportunistically. No American eels were available for sampling in 2012.

3. Estimated percent of harvest going to food versus bait

Information not available

C. Estimates of export by season (provided by dealers)

The estimated quantity of eels exported from Virginia in 2012 was obtained from the U.S. International Trade Commission (USITC 2012). Trade products are classified using the international Harmonized Commodity Description and Coding System. The Harmonized Tariff Schedule (HTS) maintained by the USITC does not have a specific code for American eel (species-specific) products. All products of eels within the genus *Anguilla* are grouped together and classified as live, fresh/chilled, or frozen. A total of 0 pounds of frozen eels and 180 pounds of live eels (*Anguilla* spp.) was exported from Virginia in 2012 (Table 2).

D. Harvest data provided as CPUE (by life stage and gear type)

Commercial harvest rates were calculated for eel pots, the dominant gear in Virginia's commercial fishery for American eels. The total weight of American eels harvested by eel pots within state waters was divided by the total number of pot-hours reported by commercial fishermen by year. The harvest rate for American eels harvested by commercial eel pots in Virginia over the past 18 years (1994 through 2012) has been variable, with evidence of an overall decline since 2000 (Figure 3). The harvest rate for 2012 was estimated at 2.51 pounds/pot-hour. This value is slightly higher than the 2011 estimate of 2.40 pounds/pot-hour and 17% lower than the 1994 through 2012 time series average harvest rate of 3.04 pounds/pot-hour.

E. Permitted catch for personal use, if available

Unknown

II. Recreational fishery

A. Synopsis of regulations in place

A copy of Chapter 4 VAC 20-500-10 et seq., "Pertaining to the Catching of Eels", that was in effect for 2012 is provided in Appendix I.

In accordance with section 4.1 of the Interstate Fishery Management Plan (FMP) for American eel (ASMFC 2000), Virginia established a minimum size limit of six inches and a possession limit of 50 eels per person per day for the American eel

recreational fishery. Virginia requires a license to catch marine species for recreational purposes in tidal waters. The use of commercial eel pots for recreational purposes requires an additional license. A license for up to two eel pots costs \$10.00, and individuals are issued no more than one recreational eel pot license. Alternatively, the purchase of a Virginia Saltwater Recreational Fishing License entitles the licensee to use two eel pots at no additional fee. Recreational eel pots are subject to the same mesh restrictions as commercial eel pots (see Section I.A., above), and buoys of any eel pot used for recreational purposes must be marked with the licensee's last four numbers of his or her social security number or driver's license number, preceded by the letter "R". The use of any eel pot in an area extending 250 yards from either span of the Chesapeake Bay Bridge Tunnel is unlawful.

B. Estimate of recreational harvest by season (if available)

The Marine Recreational Information Program (MRIP) is the primary source of recreational fisheries statistics for Virginia. In 2012, the MRIP estimated that 9,196 American eels (PSE 96.3%) were harvested (Type A+B1) by Virginia's recreational fishery. The MRIP estimate of the number of American eels that were released alive (Type B2) from Virginia's recreational fishery in 2012 was 18,261 fish (PSE 59.6%).

The limited availability of samples resulted in extremely low precision (high PSE) of Virginia's 2012 recreational fisheries estimates, and these estimates are not considered representative.

1. Biological data taken from representative sub-samples to include sex ratio, age structure, length and weight (if available)

The intercept component of the MRIP program interviews anglers to collect demographic information and individual catch data. The MRIP interviewers were not able to measure any American eels of Type A catch in Virginia during 2012.

The MRIP program also conducts at-sea sampling surveys of headboat fishing trips. These surveys are the only source of biological data characterizing discarded catch (Type 9) that are collected by the MRIP. The MRIP observers did not encounter any American eels during headboat surveys in Virginia during 2012.

III. Fishery-independent monitoring

A. Results of the Annual Young-of-Year Abundance Survey (unless exempt)

The Virginia Institute of Marine Science (VIMS) conducts the annual recruitment survey of American eels for Virginia. The results of the spring 2012 survey are presented in the attached report, provided by the VIMS (Tuckey and Fabrizio 2013).

- B. Description of other fishery-independent surveys performed (methods, location, etc.) and results (if required in FMP)

Virginia Institute of Marine Science

The VIMS Juvenile Fish and Blue Crab Survey monitors the distribution and abundance of important finfish and invertebrate species occurring in the Chesapeake Bay. The survey currently employs a stratified random design and collects samples with a trawl. The survey data are used to develop annual indices of abundance to track trends in the relative year-class strength of key species in the Bay, including American eel. Indices are calculated using a delta lognormal model number per tow, based on time and area combinations appropriate for the species (Tuckey and Fabrizio 2012). The index for American eels includes all sizes captured from the upper half of the major tributaries during April, May, and June. The VIMS index suggests relative abundance of American eels was variable in the late 1980s through early 1990s, though it has declined over the index time series (Figure 4). Please note that the VIMS index may not be a reliable index of abundance for American eels as the survey gear is not efficient for capturing this species.

Shenandoah River Project

Welsh et al. (2007) initiated a project in 2007 to evaluate upstream and downstream movements of American eels near dams on the Shenandoah River. From June to November 2012, the project monitored the number and movement rates of upstream migrants at eel ladders that were set up at the Millville and Luray dams (Welsh et al. 2012). A total of 4,185 eels was observed passing through the ladder at the Millville Dam, which is the second highest on record during the study period of 2003 through 2012. High eel counts during the study are consistent with previous year's data, which demonstrates associations between high eel count and increasing river discharges. No eels have been observed at the Luray Dam eel ladder from 2010 through 2012, which was installed during fall 2009 (Welsh et al. 2012) (Table 3).

- C. Projects planned for next five years

The VIMS will continue to perform the annual recruitment survey of American eels for Virginia in 2013. Additional studies of yellow- and silver-phase American eel migration along the Shenandoah River are planned for 2013 (Welsh et al. 2012).

IV. Characterization of other losses

To the extent possible states/jurisdictions should attempt to characterize the losses of American eel, in number and weight by life stage or age, due to factors other than commercial and recreational fisheries. Such losses may include, but are not limited to the following:

- A. Impingement/entrainment mortalities of eel at power generation facilities, water intakes, and navigation locks

Unknown

B. Bycatch mortalities in commercial and recreational fisheries

There is currently no information on the quantity of American eels caught as bycatch or discarded from Virginia's commercial fisheries.

The estimated number of American eels that were released alive (Type B2) by recreational anglers in Virginia during 2012 was 18,261 American eels (PSE 59.6%), based on the MRIP sampling program. The relatively high imprecision (high PSE) of this estimate is due to the low number of Type B2 American eels reported from Virginia by MRIP interviewers during 2012 (see Section II.B.1, above). The discard mortality of American eels released from the recreational fishery is not known, so the number of American eels that die subsequent to release by recreational anglers is uncertain

C. Confiscated poundage from illegal or undocumented fisheries (i.e., poaching)

In 2012, the VMRC Law Enforcement Division conducted 159,593 fisheries-related inspections that required 17,345 inspection hours. The inspections found 1 violation related to American eel regulations.

D. Scientific losses (i.e., samples collected for contaminants analysis, other studies)

Approximately 1,000 glass eels and 300 yellow eels were collected by VIMS to determine length, weight, and pigment stage during 2012.

E. Mass mortalities of eel due to disease, spills, or other causes

None known

V. References

- ASMFC (Atlantic States Marine Fisheries Commission). 2000. Interstate fishery management plan for American eel. ASMFC, Fishery Management Report No. 36, Washington, D.C. 93 p.
- Tuckey, T.D, and M.C. Fabrizio. 2013. Estimating relative abundance of young of year American eel, *Anguilla rostrata*, in the Virginia tributaries of Chesapeake Bay (Spring 2011). Final Report to the Virginia Marine Resources Commission Marine Recreational Fishing and Commercial Fishing Advisory Boards, Project No. RF/CF 11-01. 24p.
- USITC (U.S. International Trade Commission). 2013. U.S. domestic exports—monthly data for 2010. Interactive Tariff and Trade Dataweb [Online]. Available: <http://dataweb.usitc.gov> (August 2011).
- Welsh, S.A., D.R. Smith, S. Eyler, M.T. Mandt, and M. Braham. 2012. Migration of silver-phase and yellow-phase American eels in relation to hydroelectric dams on the Shenandoah River. Progress report submitted to Allegheny Energy Supply, December 2012. 6 p.

Table 1. Annual commercial landings (pounds) of American eels from Virginia waters, by water body, 1994 through 2012.

Year	System							Total
	Chesapeake Bay	James River	Misc. Bay Tributaries	Ocean System	Potomac River	Rappahannock River	York River	
1994	50,565	134,149	17,535	4,209	106,146	71,126	43,785	427,515
1995	20,543	97,060	13,885	997	76,933	71,990	36,215	317,623
1996	29,687	94,818	25,522	7,417	80,924	79,357	50,640	368,365
1997	19,621	28,523	14,050	6,556	61,676	43,622	34,011	208,059
1998	15,990	25,437	12,843	10,749	92,417	13,578	20,516	191,530
1999	28,207	38,084	30,189	14,083	51,959	22,237	31,944	216,703
2000	33,791	26,807	4,741	6,938	42,646	19,990	16,241	151,154
2001	25,161	30,103	4,323	5,354	50,704	6,722	19,031	141,398
2002	18,686	23,736	1,618	5,940	33,881	9,922	8,394	102,177
2003	16,659	44,654	5,725	10,626	21,750	16,942	14,078	130,434
2004	23,008	27,846	3,521	2,909	26,193	43,943	13,943	141,363
2005	19,056	18,045	2,456	2,530	11,022	11,278	9,041	73,428
2006	17,036	21,209	4,293	*	14,771	25,154	7,225	89,688**
2007	17,521	10,922	2,089	*	24,432	12,911	5,153	73,028**
2008	17,638	13,143	5,259	4,129	12,810	23,246	10,833	87,057
2009	37,526	13,344	7,768	7,406	22,891	13,277	23,453	125,665
2010	8,460	16,925	6,956	5,621	26,660	15,850	7,864	88,336
2011	18,476	24,693	8,032	5,760	18,732	28,513	6,608	110,813
2012	18,491	19,666	18,714	9,489	25,853	29,555	19,464	141,232
Total	436,122	709,164	189,519	110,713	802,400	559,213	378,439	3,185,570

*Denotes Confidential Data

**Denotes total without confidential data

Table 2. Monthly exports (pounds) of live and frozen eels (*Anguilla* spp.), excluding fillets and other fish meat, exported through Norfolk, Virginia in 2012.

Month	USITC Export Category		
	Live Eels	Frozen Eels	Total
Jan	--	--	--
Feb	180	--	180
Mar	--	--	--
Apr	--	--	--
May	--	--	--
Jun	--	--	--
Jul	--	--	--
Aug	--	--	--
Sep	--	--	--
Oct	--	--	--
Nov	--	--	--
Dec	--	--	--
Total	180	0	180

Table 3. Annual counts of eels using eel ladders at the Shenandoah River dams at Millville, Warren, and Luray. (The Millville ladder was first installed in 2003, whereas the Warren and Luray ladders were first installed in 2007 and 2010, respectively. The year 2006 was a period between study contracts).

Year	Time Period	Millville Dam	Warren Dam	Luray Dam
2003	Aug - Sep	409		
2004	May - Sep	4,200		
2005	Jun - Sep	647		
2007	May - Nov	852	21	
2008	Jun - Nov	1,616	2	
2009	Jun - Nov	1,311	4	
2010	Jun - Nov	5,394	11	0
2011	Jul - Nov	1,122	*	0
2012	May - Nov	4,185	*	0
Total		19,736	38	0

*Indicates that the ladder was not in operation during the specified year

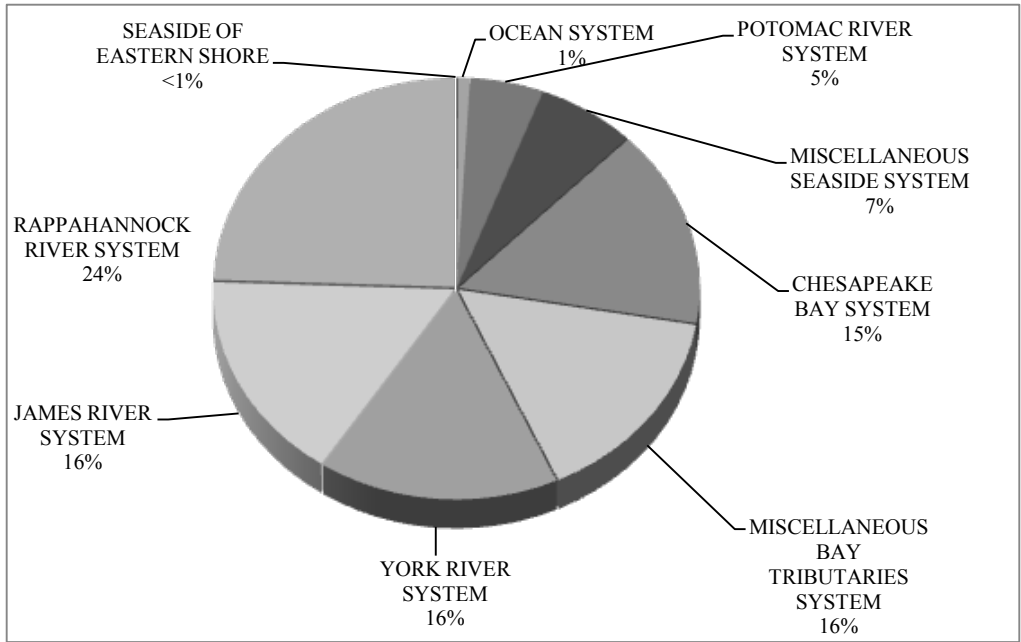


Figure 1. Commercial harvest of American eels (% of total pounds) from Virginia waters, by water body in 2012.

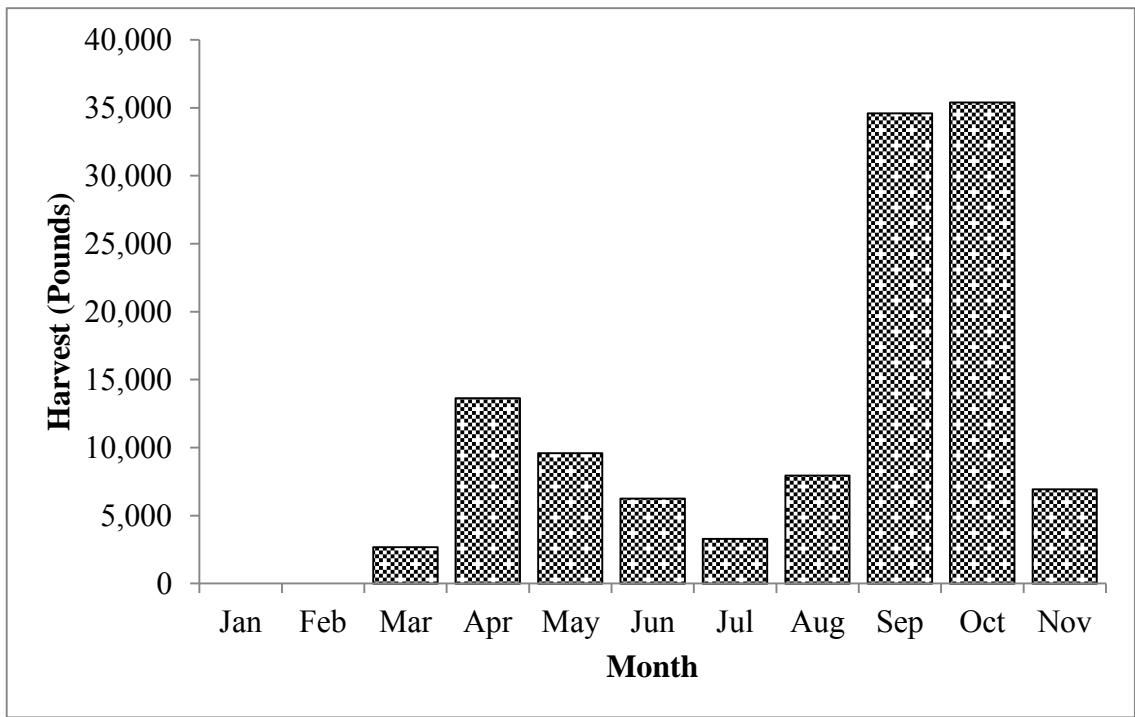


Figure 2. Commercial harvest (pounds) of American eels from Virginia waters, by month in 2012.

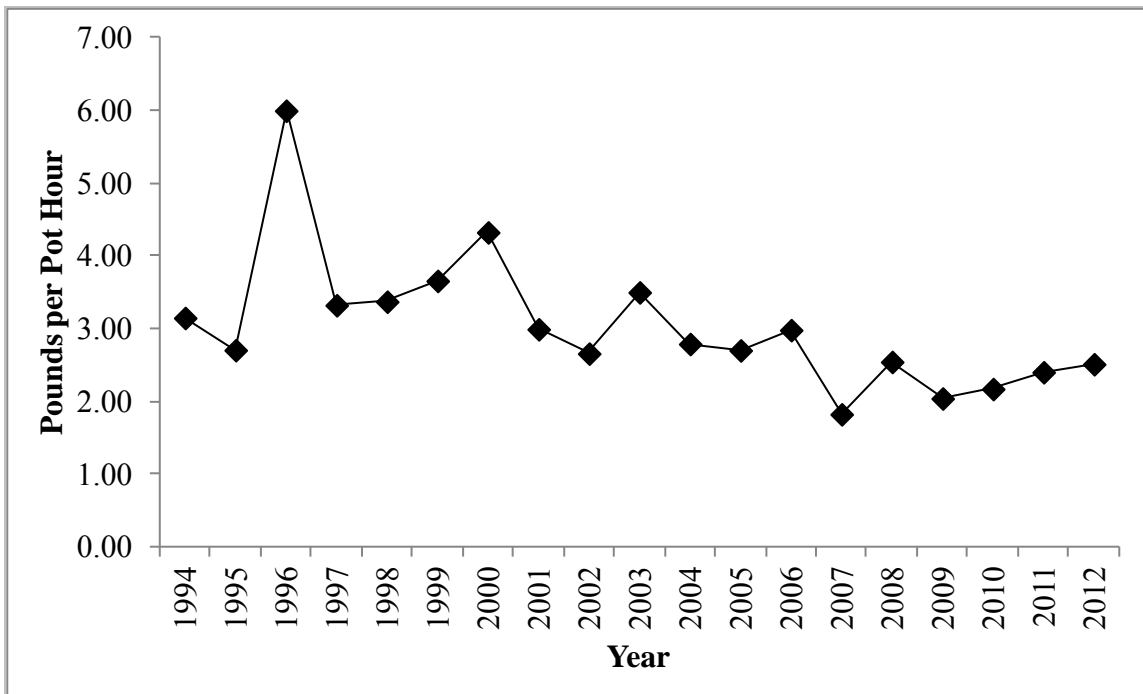


Figure 3. Annual harvest rate (pounds per pot-hour) of American eels harvested from Virginia waters by commercial eel pots, 1994 through 2012.

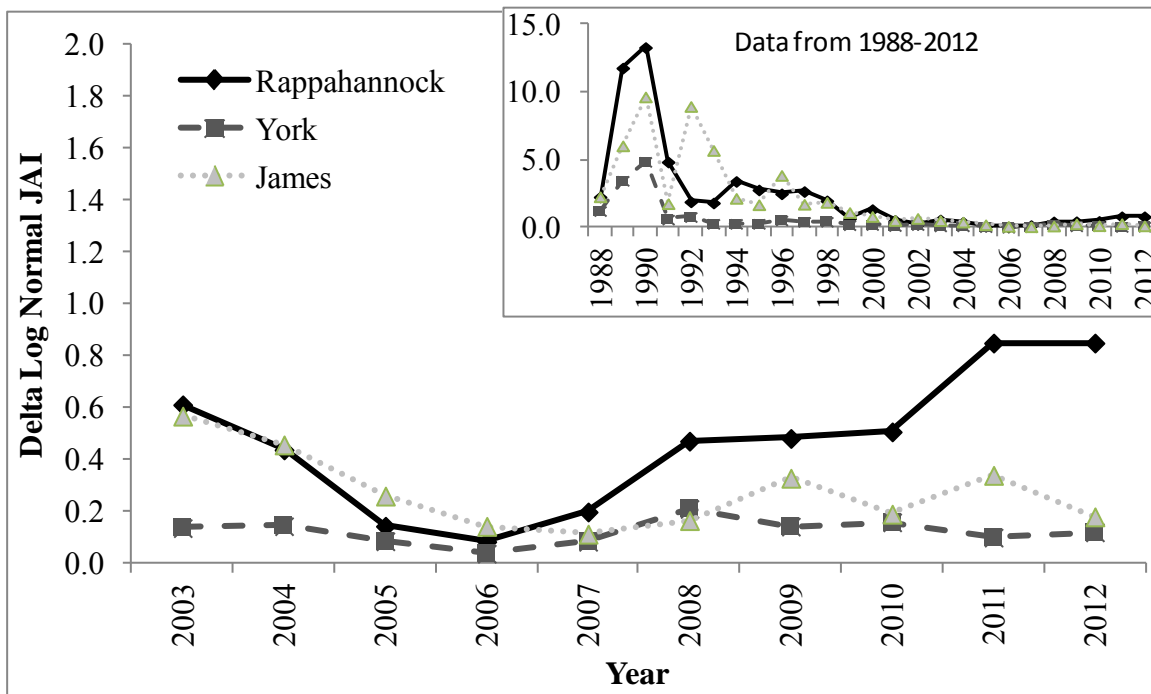


Figure 4. Annual index of American eel relative abundance based on the VIMS Juvenile Fish and Blue Crab Survey using a delta lognormal model, 2003 through 2012 (Inset depicts 1988 through 2012 data)

APPENDIX I. Copy of the Virginia Marine Resources Commission's regulations for American eel fisheries that were in effect in 2012.

Virginia Marine Resources Commission

Regulation 4 VAC 20-500-10 et seq.

"Pertaining to the Catching of Eels"

PREAMBLE

This regulation establishes a minimum mesh size and escape panels for eel pots, and prohibits the taking of elvers except for research and aquaculture purposes. This regulation also establishes a recreational possession limit on eels.

This regulation is promulgated pursuant to the authority contained in §28.2-201 of the Code of Virginia. This regulation amends and re-adopts previous Regulation 4 VAC 20-500-10 et seq. which was adopted February 24, 1998 and was effective March 1, 1998. The effective date of this regulation is March 1, 2000.

4 VAC 20-500-10. PURPOSE.

The purpose of this chapter is to provide for appropriate conservation of eels, to reduce the possibility of growth overfishing, and to prevent waste of small eels.

4 VAC 20-500-20. DEFINITION.

The following word and term, when used in this chapter, shall have the following meaning unless the context clearly indicates otherwise.

"Elver" means any eel of less than six inches in total length.

4 VAC 20-500-30. RESCISION.

4 VAC 20-180-10 is rescinded, and its provisions are amended and readopted in 4 VAC 20-500-40 of this chapter.

4 VAC 20-500-40. ELVERS.

It shall be unlawful for any person to possess elvers; provided however, that elvers may be taken (i) for research only by duly appointed representatives of any institution of higher education in Virginia and by other parties, when specifically authorized in writing by the Commissioner of Marine Resources, or (ii) by those persons who are approved for a permit for eel aquaculture by the Commission.

4 VAC 20-500-50. MINIMUM MESH SIZE.

A. It shall be unlawful for any person to place, set or fish any eel pot in Virginia tidal waters which has a mesh less than 1/2- inch by 1/2- inch.

APPENDIX I. Copy of the Virginia Marine Resources Commission's regulations for American eel fisheries that were in effect in 2012.

Virginia Marine Resources Commission

Regulation 4 VAC 20-500-10 et seq.

"Pertaining to the Catching of Eels"

- B. It shall be unlawful for any person to place, set or fish any 1/2-inch by 1/2-inch mesh rectangular or square eel pot unless such pot contains at least one unrestricted 4-inch by 4-inch escape panel consisting of 1/2-inch by 1-inch mesh. In addition, it shall be unlawful for any person to place, set or fish any 1/2-inch by 1/2-inch mesh cylindrical eel pot unless such pot contains at least one unrestricted 4-inch square escape panel of 1/2-inch by 1-inch mesh.

4 VAC 20-500-55. POSSESSION LIMIT.

- A. It shall be unlawful for any person fishing with recreational hook-and-line, rod-and-reel, spear, gig or other recreational gear to possess more than 50 eels. When fishing is from a boat or vessel where the entire catch is held in a common hold or container, the possession limit shall be for the boat or vessel and shall be equal to the number of persons on board legally eligible to fish multiplied by 50. The captain or operator of the boat or vessel shall be responsible for any boat or vessel possession limit. Any eel taken after the possession limit has been reached shall be returned to the water immediately.
- B. Possession of any quantity of eel which exceeds the possession limit described in subsection A of this section shall be presumed to be for commercial purposes.

4 VAC 20-500-60. PENALTY.

As set forth in § 28.2-903 of the Code of Virginia, any person violating any provision of this chapter shall be guilty of a Class 3 misdemeanor, and a second or subsequent violation of any provision of this chapter committed by the same person within twelve months of a prior violation is a Class 1 misdemeanor.

North Carolina American Eel Compliance Report for 2012

North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries
PO Box 769
Morehead City, NC 28557

September 2013

INTRODUCTION

In North Carolina during the 2012 fishing year the trip ticket program reported 193 commercial trips that harvested 66,580 pounds of American eel. Eel pots were the dominant commercial gear, comprising 76.7% of trips taken and capturing 88.0% of the 2012 landings. There were no changes to regulations. The elver young of year (Y-O-Y) monitoring program was eliminated in 2009 due to state budget issues. For 2009 - 2012 elver monitoring, Y-O-Y data has been requested from the NOAA bridge net survey for North Carolina. NOAA currently has a backlog of samples and funding has been secured through a North Carolina Coastal Recreational Fishing License Fund grant to address the backlog of samples. In order to comply with Addendum 1 to the American eel fishery management plan by ASMFC, North Carolina implemented an eel pot logbook in January 2007 (Appendix 3), which allows for trip-level catch and effort monitoring. Preliminary results from 2012 are included in the commercial harvest section (1.b, Table 6).

REQUEST FOR DE MINIMIS

North Carolina does not request *de minimis* status for 2013.

2012 FISHERY AND MANAGEMENT PROGRAMS (in accordance with Section 5.1.2)

1. COMMERCIAL FISHERY

a. Synopsis of Regulations

North Carolina's internal waters are classified as inland, joint or coastal fishing waters. The North Carolina Marine Fisheries Commission (NCMFC) and North Carolina Division of Marine Fisheries (NCDMF) have jurisdiction of coastal waters while the North Carolina Wildlife Resources Commission (NCWRC) has jurisdiction of inland waters and both agencies (NCWRC and NCMFC/NCDMF) have authority within joint waters. Other than a few specific regulations, none of which pertain to American eel, commercial activities and recreational activities using commercial gear (devices) occurring in joint waters fall under the discretion of the NCMFC/NCDMF. Refer to Appendix 1, North Carolina Administrative Code, Chapter 15A Subchapter 10C Section .0100 for more detail concerning classification and jurisdiction of North Carolina's waters.

Coastal and Joint waters

G. S. 113-168.2. (Standard or Retired Commercial Fishing License, SCFL & RSFCL)
(a) Requirement - Except as otherwise provided in this Article, it is unlawful for any person to engage in a commercial fishing operation in coastal fishing waters without holding a SCFL issued by the Division. (Note-There is a limited number of these licenses that may be issued each year ~8,900).

15A NCAC 3M .0510 AMERICAN EEL

It is unlawful to:

- (1) Possess, sell or take eels less than six (6) inches in length.

15A NCAC 3J .0301: CRAB, EEL, FISH, AND SHRIMP POTS

(f) It is unlawful to use eel pots with mesh sizes smaller than one inch by one-half inch unless such pots contain an escape panel that is at least four inches square with a mesh size of 1" x ½" located in the outside panel of the upper chamber of rectangular pots and in the rear portion of cylindrical pots, except that not more than two eel pots per fishing operation with a mesh of any size may be used to take eels for bait.

Inland Waters

15A NCAC 10C .0401: MANNER OF TAKING NONGAME FISHES: PURCHASE AND SALE

(c) Nongame fishes, except alewife and blueback herring, excluding those less than six inches in length collected from Kerr Reservoir (Granville, Vance, and Warren counties), blue crab, bowfin, taken by hook and line, grabbling or by licensed special devices may be sold. Eels less than six inches in length may not be taken from inland waters for any purpose.

15A NCAC 10C .0402: TAKING NONGAME FISHES FOR BAIT

(c) Game fishes and their young taken while netting for bait shall be returned unharmed to the water.

(d) No person shall take or possess during one day more than 200 nongame fish in aggregate for bait or personal consumption subject to the following restrictions:

- (1) No more than 50 eels, none of which may be less than six inches in length, shall be taken or possessed from inland fishing waters.

15A NCAC 10C .0404: SPECIAL DEVICE FISHING

(f) Eel pots. It is unlawful to use pots with mesh sizes smaller than one inch by one-half inch unless such pots contain an escape panel that is at least four inches square with a mesh size of one inch by one-half inch located in the outside panel of the upper chamber of rectangular pots and in the rear portion of cylindrical pots.. Each pot must be marked by attaching a floating buoy which shall be of solid foam or other solid buoyant material and no less than five inches in diameter and no less than five inches in length. Buoys may be of any color except yellow. The owner shall always be identified on the attached buoy by using engraved buoys or by engraved metal or plastic tags attached to the buoy. Such identification shall include one of the following:

- (1) owner's N.C. motorboat registration number; or
- (2) owner's U.S. vessel documentation name; or
- (3) owner's last name and initials.

15A NCAC 10C .0407: PERMITTED SPECIAL DEVICES AND OPEN SEASONS

Except in designated public mountain trout waters, and in impounded waters located on the Sandhills Game Land, there is a year-round open season for the licensed taking of nongame fishes by bow and arrow. The use of special fishing devices in impoundments located entirely on game lands is prohibited. Seasons and waters in which the use of other special devices is authorized are indicated by counties below:

(63) Onslow:

- (b) August 1 to March 31 with eel pots in the main run of New River between US 17 bridge and the mouth of Hawkins Creek;

b. Directed Commercial Harvest Estimates

The North Carolina Division of Marine Fisheries Trip Ticket Program (NCTTP) began on 1 January 1994 (Appendix 2). The NCTTP was initiated to respond to demand for complete and accurate trip-level commercial harvest statistics by fisheries managers. The detailed data obtained through the NCTTP allows for the calculation of effort (i.e. trips, licenses, participants, vessels) in a given fishery that was not available prior to 1994 and provides a much more detailed account of North Carolina's seafood harvest. All fish dealers in North Carolina must file a form (Trip Ticket) documenting all transfers of fish from the fishermen to the dealer. These forms include geographical and gear catch information.

Due to North Carolina regulation 15A NCAC 3M .0510: making it unlawful to possess, sell or take eels less than six inches in length, all commercial fishery information presented in this report will pertain to yellow and silver eel life stages (1.b.1).

Two main gear types (crab pots and eel pots) were used in the harvest of American eel in 2012. The total 2012 harvest was 66,580 lbs, 88.0% of which was captured by eel pot (Table 1). In 2012 the majority of the harvest took place September through December (91.8%). Due to confidentiality provisions, some harvest can't be reported by month. The majority of eel trips took place in September through November (Table 2). Eel pots continue to be the dominant commercial gear used (76.7%), with crab pots (21.2%) the second most abundant (Table 3).

For reporting purposes water bodies were grouped into "Albemarle Sound Area", "Pamlico Sound Area" and "Other Areas" (Figure 1). The majority of landings in 2012 were captured in the Albemarle Sound Area (93.4%; Table 4). Similar to landings, the vast majority (90.7%) of commercial trips were taken in the Albemarle Sound Area (Table 5).

Prior estimates of catch rate, or catch-per-unit-effort (CPUE), for North Carolina were confounded by eel fishermen holding catches, from several days of fishing, in holding pens and later selling these "accumulated" catches to dealers. In 2007, a new eel pot logbook program was implemented at the individual commercial fisherman level (Appendix 3), providing documentation on the number of pots fished, soak time, and landings per pot. Ninety-four percent of trip tickets matched with eel monitoring logs for 2007 and 2008 (McInerney and Kemp 2010). Reported poundage from the eel logbooks matched well with that reported at the NCTTP dealer level. At this time, the 2012 eel pot logbook data has not been completely reconciled with the trip ticket program so the results shown in Table 6 are considered preliminary. NCDMF is reviewing the discrepancies between the two systems to identify where the reporting differences occurred. However, it is unlikely all discrepancies can be reconciled due to fisherman estimating logbook weights coupled with holding pen escapement, dead loss, and weight loss. Reported harvest from the 2012 eel logbook (63,213 lbs.) is less than that reported at the NCTTP dealer level (65,580 lbs.) but this difference is expected to diminish after the complete data review. The other measures of effort recorded in the eel pot logbooks for 2008 – 2012 (pot sets, soak days) are provided in Table 6.

At the present time sex ratio and age structures are not collected (1.b.2). Further, there is no estimate of the percent harvest going to food versus bait (1.b.3).

Table 1: Contribution by gear type to the commercial harvest (lbs) of American eel in North Carolina waters, 1997- 2012.

Year	Crab Pot	Crab Trawl	Eel Pot	Fish Pot	Fyke Net	Gill Net	Peeler Pot	Pound Net	Shrimp Trawl	Trotline	Turtle Pot	Total
1997 lbs	3,648	0	124,097	295	0	245	224	106	37	16	0	128,668
%	2.8	-	96.5	0.2	-	0.2	0.2	0.1	<0.1	<0.1	-	
1998 lbs	7,889	0	82,738	0	0	32	379	35	0	0	11	91,084
%	8.7	-	90.8	-	-	<0.1	0.4	<0.1	-	-	0.0	
1999 lbs	3,919	0	94,726	0	232	22	954	77	5	4	0	99,939
%	3.9	-	94.8	-	0.2	-	1	0.1	<0.1	<0.1	-	
2000 lbs	7,395	0	118,641	0	23	41	646	116	147	90	0	127,099
%	5.8	-	93.4	-	-	<0.1	0.5	0.1	0.1	0.1	-	
2001 lbs	3,896	5	102,634	148	93	20	160	108	0	6	0	107,070
%	3.6	<0.1	95.9	0.1	0.1	<0.1	0.2	0.1	-	<0.1	-	
2002 lbs	3,291	0	56,065	0	0	106	451	25	0	2	0	59,940
%	5.5	-	93.5	-	-	0.2	0.8	<0.1	-	<0.1	-	
2003 lbs	2,038	0	169,297	0	0	5	620	50	0	55	0	172,065
%	1.2	-	98.4	-	-	<0.1	0.4	<0.1	<0.1	<0.1	-	
2004 lbs	1,405	0	126,333	50	0	208	872	3	0	4	0	128,875
%	1.2	-	98.4	<0.1	-	<0.1	0.4	<0.1	-	<0.1	<0.1	
2005 lbs	1,140	0	47,585	11	0	299	234	9	0	0	0	49,278
%	2.3	-	96.6	<0.1	-	0.6	0.5	<0.1	-	-	-	
2006 lbs	699	0	32,775	2	0	22	76	1	0	6	0	33,581
%	2.1	-	97.6	<0.1	-	0.1	0.2	<0.1	-	<0.1	-	
2007 lbs	47	0	34,102	*	0	*	206	19	*	*	0	34,486
%	0.1	-	98.9	<0.1	-	<0.1	0.6	<0.1	<0.1	<0.1	-	
2008 lbs	934	0	23,671	0	0	0	35	*	0	0	0	24,658
%	3.8	-	96.0	-	-	-	0.1	<0.1	-	-	-	
2009 lbs	791	0	64,582	0	11	40	50	*	0	0	0	65,481
%	1.2	-	98.6	-	<0.1	<0.1	<0.1	<0.1	-	-	-	
2010 lbs	786	0	121,224	0	0	40	*	0	0	0	0	122,104
%	1.2	-	98.6	-	-	<0.1	<0.1	-	-	-	-	
2011 lbs	148	0	60,970	0	0	*	311	7	0	0	0	59,181
%	0.2	-	99.2	-	-	<0.1	0.5	<0.1	-	-	-	
2012 lbs	8,009	0	58,561	*	0	0	*	*	0	0	0	66,580
%	12.0	-	88.0	<0.1	-	-	<0.1	<0.1	-	-	-	

* Data deemed confidential due to reporting from less than three participants, vessels, or dealers.

Table 2: North Carolina 2012 monthly landings (lbs) and trips for American eels.

Month	Pounds	% Total	Trips	% Total
January	*	*	1	0.5
February	0.0	-	0	
March	1,940.0	2.9	7	3.6
April	1,909.0	2.9	11	5.7
May	*	*	2	1.0
June	*	*	1	0.5
July	0.0	-	0	-
August	*	*	2	1.0
September	9,222.0	13.9	31	16.1
October	25,527.0	38.3	69	35.8
November	20,616.0	31.0	55	28.5
December	5,774.0	8.7	14	7.3
Total	66,580.0		193	

* Data deemed confidential due to reporting from less than three participants, vessels, or dealers.

Table 3: Contribution (trips) by gear type to the number commercial trips for American eel in North Carolina waters, 1997-2012.

Year	Crab Pot	Crab Trawl	Eel Pot	Fish Pot	Fyke Net	Gill Net	Peeler Pot	Pound Net	Shrimp Trawl	Trotline	Turtle Pot	Cast Net	Total Trips
1997	63	0	452	1	0	11	29	50	3	9	0	0	618
%	10.2	-	73.1	0.2	-	1.8	4.7	8.1	0.5	1.5	0	-	
1998	107	0	368	0	0	14	51	13	0	0	1	0	554
%	19.3	-	66.4	-	-	2.5	9.2	2.4	-	-	0.2	-	
1999	68	0	367	0	1	10	88	37	2	0	1	0	574
%	11.8	-	64	-	0.2	1.7	15.3	6.5	0.4	-	0.2	-	
2000	109	0	311	0	2	11	74	38	19	0	14	0	578
%	18.9	-	53.8	-	0.4	1.9	12.8	6.6	3.3	-	2.4	-	
2001	78	1	304	1	5	6	21	42	0	2	0	0	460
%	17	-	66.1	-	1.1	1.3	4.6	9.1	-	0.4	-	-	
2002	76	0	173	0	0	2	24	11	0	1	0	0	287
%	26.5	-	60.3	-	-	0.7	8.4	3.8	-	0.4	-	-	
2003	56	0	287	0	0	3	55	20	0	6	0	0	427
%	13.1	-	67.2	-	-	0.7	12.9	4.7	-	1.4	-	-	
2004	37	0	238	4	0	16	54	3	0	1	0	0	353
%	10.5	-	67.4	1.1	-	4.5	15.3	0.8	-	0.3	-	-	
2005	26	0	141	1	0	10	40	6	0	0	0	0	224
%	11.6	-	62.9	0.4	-	4.5	17.9	2.7	-	-	-	-	
2006	33	0	81	1	0	4	21	1	0	1	0	0	142
%	23.2	-	57.0	0.7	-	2.8	15.0	0.7	-	0.7	-	-	
2007	10	0	76	1	0	1	31	6	1	1	0	0	130
%	7.7	-	58.5	0.7	-	0.7	23.8	4.6	0.7	0.7	-	-	
2008	25	0	34	0	0	0	8	2	0	0	0	1	70
%	35.7	-	48.6	-	-	-	11.4	2.9	-	-	-	1.4	
2009	40	0	64	0	5	7	9	2	1	0	0	0	128
%	31.3	-	50.0	-	3.9	5.5	7.0	1.6	0.8	-	-	-	
2010	39	0	112	0	0	5	5	0	0	0	0	0	163
%	23.9	-	68.7	-	-	3.1	3.1	-	-	-	-	-	
2011	14	0	82	0	0	3	24	4	0	0	0	0	127
%	11.0	-	64.6	-	-	2.4	18.9	3.2	-	-	-	-	
2012	41	0	148	1	0	0	1	2	0	0	0	0	193
%	21.2	-	76.7	0.5	-	-	0.5	1.0	-	-	-	-	

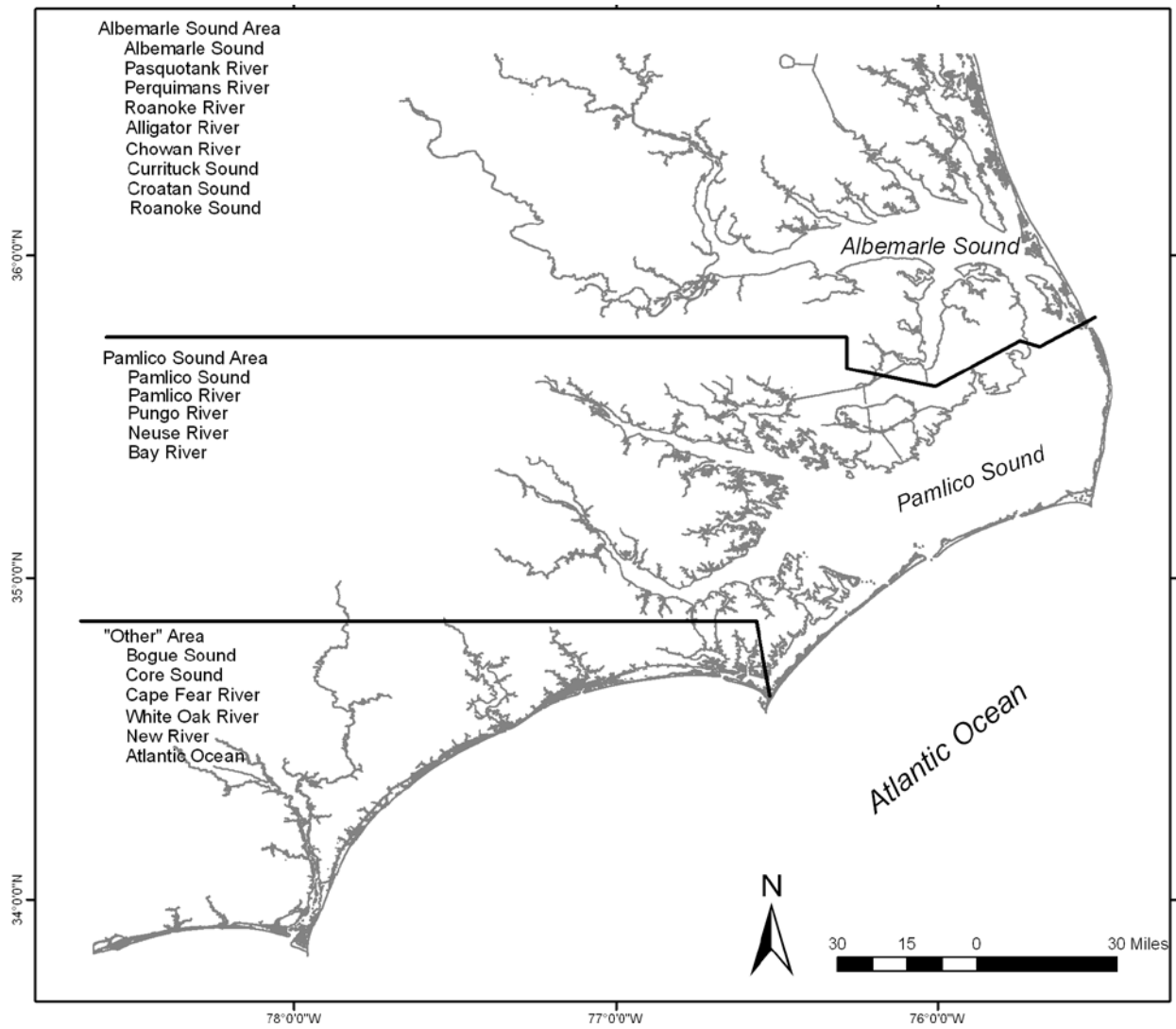


Figure 1: Map of the three waterbody "areas".

Table 4: Pounds and percent contribution by water body for American eel commercial harvest, 1997-2012.

Year	Albemarle	Pamlico	Other	Total
1997	102,280	23,493	2,895	128,668
%	79.5	18.3	2.2	
1998	60,055	30,051	978	91,084
%	65.9	33	1.1	
1999	66,346	30,961	2,632	99,939
%	66.4	31	2.6	
2000	106,087	16,793	4,219	127,099
%	83.5	13.2	3.3	
2001	95,648	8,692	2,730	107,070
%	89.3	8.1	2.6	
2002	44,381	15,128	*	59,940
%	74.1	25.2	*	
2003	142,905	24,340	*	172,065
%	83	14.2	-	
2004	118,808	9,462	*	128,875
%	92.2	7.3	*	
2005	34,795	14,483	*	49,278
%	70.6	29.4	*	
2006	24,361	9,219	*	33,581
%	72.5	27.5	*	
2007	32,704	*	*	34,486
%	94.8	*	*	
2008	22,431	2,190	*	24,658
%	91.0	8.9	*	
2009	59,602	5,871	*	65,481
%	91.0	8.9	*	
2010	118,813	3,240	51	122,104
%	97.3	2.6	0.1	
2011	58675	*	*	61,480
%	95.3	*	*	
2012	62,177	4,397	*	65,580
%	93.4	8.3	*	

* Data deemed confidential due to reporting from less than three participants, vessels, or dealers.

Table 5: Trips and percent contribution by water body for American eel in North Carolina waters, 1997-2012.

Year	Albemarle	Pamlico	Other	Total
1997	499	92	27	618
%	80.7	14.9	4.4	
1998	470	81	3	554
%	85	14.6	0.6	
1999	480	89	5	574
%	83.6	15.5	0.9	
2000	463	104	11	578
%	80.1	18	1.9	
2001	405	49	6	460
%	88	10.7	1.3	
2002	229	55	3	287
%	79.8	19.2	1.1	
2003	361	64	2	427
%	84.5	15	0.5	
2004	303	49	1	353
%	85.8	13.9	0.3	
2005	176	48	0	224
%	78.6	21.4	-	
2006	109	32	1	142
%	76.8	22.5	0.7	
2007	120	4	6	130
%	92.3	3	4.7	
2008	62	6	2	70
%	88.6	8.6	2.8	
2009	107	17	4	128
%	83.6	13.3	3.1	
2010	133	25	5	163
%	81.6	15.3	3.1	
2011	119	8	0	
%	93.7	6.3	-	
2012	175	16	2	193
	90.7	8.3	1.0	

Table 6. Monthly effort from eel pot logbooks, 2008 – 2012.

Month	2008			2009			2010			2011		
	Pots set	Soak days	Logbook trips	Pots set	Soak days	Logbook trips	Pots set	Soak days	Logbook trips	Pots set	Soak days	Logbook trips
January	0	0	0	0	0	0	0	0	0	1,700	4,200	9
February	100	300	1	413	1,650	5	0	0	0	0	0	0
March	4,190	12,260	27	4,318	12,499	20	0	0	0	6,590	10,780	17
April	1,400	3,550	5	4,720	12,195	28	15,222	33,795	57	5,525	13,240	37
May	1,400	2,200	7	225	675	3	650	1,200	7	1,830	6,410	16
June	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	60	90	2	2,160	8,820	9	0	0	0
September	150	375	6	13,905	19,185	70	18,585	29,840	65	5,900	10,700	31
October	8,250	18,365	45	29,420	58,870	134	37,858	72,091	146	22,870	45,910	101
November	5,955	17,465	34	17,575	31,265	89	19,645	33,530	77	15,573	32,633	86
December	1,540	5,470	15	3,975	9,600	27	18,815	47,645	111	9,440	24,975	51
Total	22,985	59,985	140	74,611	146,029	378	112,935	226,921	472	69,428	148,848	348

Month	2012		
	Pots set	Soak days	Logbook trips
January	0	0	0
February			
March	5,601	12,001	29
April	1,752	3,953	23
May	238	496	5
June	206	358	6
July	1,650	2,400	10
August	400	600	2
September	11,448	27,780	65
October	22,610	56,479	123
November	15,970	44,471	96
December	3,338	10,477	24
Total	63,213	159,015	383

Note: Logbook reported pounds by year: 2008-24,673 lbs, 2009-65,659 lbs, 2010-115,125 lbs, 2011-61,283, 2012-53,826). The 2012 data are preliminary and undergoing reconciliation within the trip ticket program.

c. Estimates of export by season

No data is available on percentage of commercial catch exported by season.

d. Commercial catch for personal use

No data is available on percentage of commercial catch reserved for personal use.

2. RECREATIONAL FISHERY

a. Synopsis of Regulations

Coastal and Joint waters

15A NCAC 3M .0510: AMERICAN EEL

It is unlawful to:

- (1) Possess, sell or take eels less than six (6) inches in length.
- (2) Possess more than 50 eels per person per day for recreational purposes

15A NCAC 3J .0301: CRAB, EEL, FISH, AND SHRIMP POTS

- (f) It is unlawful to use eel pots with mesh sizes smaller than one inch by one-half inch unless such pots contain an escape panel that is at least four inches square with a mesh size of 1" x ½" located in the outside panel of the upper chamber of rectangular pots and in the rear portion of cylindrical pots, except that not more than two eel pots per fishing operation with a mesh of any size may be used to take eels for bait.

15A NCAC 3O .0302: AUTHORIZED GEAR FOR RCGL

- (a) The following are the only commercial fishing gear authorized (including restrictions) for use under a valid Recreational Commercial Gear License (*may not be sold*):
 - (3) With or without a vessel, five eel, fish, shrimp, or crab pots in any combination, except only two pots of the five pots may be eel pots. Peeler pots are not authorized for recreational purposes.

Inland waters

A noncommercial special device license is required if three (3) or fewer special devices are used regardless of purpose (commercial or recreational). Costs for a noncommercial special inland fishing devices license is \$10.00 for North Carolina residents and \$50.00 for non-residents. A commercial inland special fishing devices license is \$100.00 for North Carolina residents and \$200.00 for non-residents.

15A NCAC 10C .0401: MANNER OF TAKING NONGAME FISHES: PURCHASE AND SALE

- (c) Nongame fishes, except alewife and blueback herring, excluding those less than six inches in length collected from Kerr Reservoir (Granville, Vance, and Warren counties), blue crab, and bowfin, taken by hook and line, grabbling or by licensed special devices may be sold. Eels less than six inches in length may not be taken from impounded waters for any purpose.

15A NCAC 10C .0402: TAKING NONGAME FISHES FOR BAIT OR PERSONAL CONSUMPTION

(c) Game fishes and their young taken while netting for bait shall be returned unharmed to the water.

(d) No person shall take or possess during one day more than 200 nongame fish in aggregate for bait or personal consumption subject to the following restrictions:

(1) No more than 50 eels, none of which may be less than six inches in length shall be taken or possessed from inland fishing waters.

15A NCAC 10C .0404: SPECIAL DEVICE FISHING

(f) Eel pots. It is unlawful to use pots with mesh sizes smaller than one inch by one-half inch unless such pots contain an escape panel that is at least four inches square with a mesh size of one inch by one-half inch located in the outside panel of the upper chamber of rectangular pots and in the rear portion of cylindrical pots. Each pot must be marked by attaching a floating buoy which shall be of solid foam or other solid buoyant material and no less than five inches in diameter and no less than five inches in length. Buoys may be of any color except yellow. The owner shall be identified on the attached buoy by using engraved buoys or by engraved metal or plastic tags attached to the buoy.

Such identification shall include one of the following:

- (1) owner's N.C. motorboat registration number; or
- (2) owner's U.S. vessel documentation name; or
- (3) owner's last name and initials.

15A NCAC 10C .0407: PERMITTED SPECIAL DEVICES AND OPEN SEASONS

Except in designated public mountain trout waters, and in impounded waters located on the Sandhills Game Land, there is a year-round open season for the licensed taking of nongame fishes by bow and arrow. The use of special fishing devices in impoundments located entirely on game lands is prohibited. Seasons and waters in which the use of other special devices is authorized are indicated by counties below:

(63) Onslow:

(b) August 1 to March 31 with eel pots in the main run of New River between US 17 bridge and the mouth of Hawkins Creek

b. Recreational Harvest Estimate

Beginning in 2002, the NCDMF initiated a survey to estimate the harvest from recreational fisherman using commercial gear. Each month 30% of all recreational commercial gear license (RCGL) holders were mailed questionnaires to collect information on catch and effort. Data returned was extrapolated to the entire RCGL population to produce harvest estimates. Since 2002, eel capture from reported RCGL surveys was found to be too insignificant to infer recreational landings. The RCGL survey ended in 2008 due to budget constraints. Also, there is no recreational information available for biological data to include sex ratio, age structures, or length and weight (2.b.1).

3. FISHERY INDEPENDENT MONITORING

a. Annual young-of year (Y-O-Y) abundance survey

Prior to 2009 the NCDMF utilized a small mesh fyke net with a lead length of 17 feet, mesh size of 0.125 inches, and a funnel diameter of 24 inches to conduct the mandatory Y-O-Y survey on

the Newport River. Any American eels taken were counted, measured and the pigmentation stage was assigned using the Haro and Krueger scale. A total of 283 elvers (pigmentation stage 1-7) were collected in 25 sampling events. Results were provided in the 2008 compliance report by pigmentation stage for each location. In 2009, the state mandated budget reductions for the NCDMF and in order to meet the required levels of reduction, this survey was terminated. At the February 2009 ASMFC Eel Board meeting the NCDMF Director noted that North Carolina will be relying solely on the NOAA Beaufort Lab bridge net index. The NOAA Beaufort Lab bridge net survey data has been requested but elver numbers for 2012 are currently unavailable due to a backlog of processing the samples.

b. Other fishery-independent surveys performed

The NCDMF has no other current fishery-independent monitoring programs specifically for American eel.

c. Project planned for next five years

No additional projects are planned for American eel due to reduced state funds from ongoing budget shortfalls.

4. CHARACTERIZATION OF OTHER LOSSES

a. Impingement/entrainment mortalities of eel at power generation facilities, water intakes, and navigation locks

No data is available on known losses due to impingement/entrainment mortalities of eel at power generation facilities, water intakes, and navigation locks.

b. Bycatch mortalities in commercial and recreational fisheries

There was no documented or known bycatch mortality in the commercial or recreational fisheries.

c. Confiscated poundage from illegal or undocumented fisheries

There was no confiscated poundage from illegal or undocumented fisheries.

d. Scientific losses

In 2012, 51 eels were collected under Scientific and Educational Collection permits, of which 49 were returned to the water, limiting scientific losses to 2 individuals.

e. Mass mortalities of eel due to disease, spills or other causes

There were no mass mortality events in 2012.

Literature Cited

McInerny S. A. and G. H. Kemp. 2010. Monitoring of commercial catch and effort in the North Carolina *Anguilla rostrata* fishery, 2007–2008. Report for Atlantic Coastal Fisheries Cooperative Management Act Grant No. NA04NMF4740476. North Carolina Division of Marine Fisheries, Morehead City, NC. 14 pp.

APPENDIX 1

SUBCHAPTER 10C - INLAND FISHING REGULATIONS: SECTION .0100 - JURISDICTION OF AGENCIES: CLASSIFICATION OF WATERS

15A NCAC 10C .0101 SCOPE AND PURPOSE

The following rules pertain to the classification of the waters of North Carolina as coastal fishing waters, inland fishing waters and joint fishing waters. These rules are adopted jointly by the Marine Fisheries Commission and the Wildlife Resources Commission. In addition to the classification of the waters of the state these joint rules set forth guidelines to determine which fishing activities in joint waters are regulated by the Marine Fisheries Commission and which are regulated by the Wildlife Resources Commission. Finally, the joint rules set forth special fishing regulations applicable in joint waters that can be enforced by officers of the division of marine fisheries and the Wildlife Resources Commission. These regulations do not affect the jurisdiction of the Marine Fisheries Commission and the Wildlife Resources Commission in any matters other than those specifically set out.

*History Note: Authority G.S. 113-134; 113-132; 113-136;
Eff. February 1, 1976;
Amended Eff. January 1, 1977.*

15A NCAC 10C .0102 INLAND FISHING WATERS

Inland fishing waters are all inland waters except private ponds; and all waters connecting with or tributary to coastal sounds or the ocean extending inland from the dividing line between coastal fishing waters and inland fishing waters agreed upon by the Marine Fisheries Commission and the Wildlife Resources Commission. All waters which are tributary to inland fishing waters and which are not otherwise designated by agreement between the Marine Fisheries Commission and the Wildlife Resources Commission are inland fishing waters. The regulation and licensing of fishing in inland fishing waters is under the jurisdiction of the Wildlife Resources Commission. Regulations and laws administered by the Wildlife Resources Commission regarding fishing in inland fishing waters are enforced by wildlife enforcement officers.

Note: A private pond is a body of water arising within and lying wholly upon the lands of a single owner or a single group of joint owners or tenants in common, and from which fish cannot escape, and into which fish of legal size cannot enter from public waters at any time. This does not include any impoundment located on land owned by a public body or governmental entity.

*History Note: Authority G.S. 113-134; 113-129; 113-132;
Eff. February 1, 1976;
Amended Eff. January 1, 1977.*

15A NCAC 10C .0103 COASTAL FISHING WATERS

Coastal fishing waters are the Atlantic Ocean, the various coastal sounds, and estuarine waters up to the dividing line between coastal fishing waters and inland fishing waters agreed upon by the Marine Fisheries Commission and the Wildlife Resources Commission. All waters which are tributary to coastal fishing waters and which are not otherwise designated by agreement between the Marine Fisheries Commission and the Wildlife Resources Commission are coastal fishing waters. The regulations and licensing of fishing in coastal fishing waters is under the jurisdiction of the Marine Fisheries Commission; except that inland game fish (exclusive of

spotted sea trout, red drum, flounder, white perch, yellow perch, weakfish, and striped bass) are subject to regulations by the Wildlife Resources Commission in coastal fishing waters. Regulations and laws administered by the Marine Fisheries Commission regarding fishing in coastal waters are enforced by marine fisheries inspectors. Regulations regarding inland game fish in coastal waters are enforced by wildlife protectors unless otherwise agreed to by the Wildlife Resources Commission.

*History Note: Authority G.S. 113-129; 113-132; 113-134; 113-292;
Eff. February 1, 1976;
Amended Eff. July 1, 1991; January 1, 1977.*

15A NCAC 10C .0104 JOINT FISHING WATERS

Joint fishing waters are those coastal fishing waters, hereinafter set out, denominated by agreement of the Marine Fisheries Commission and the Wildlife Resources Commission pursuant to G.S. 113-132(e) as joint fishing waters. All waters which are tributary to joint fishing waters and which are not otherwise designated by agreement between the Marine Fisheries Commission and the Wildlife Resources Commission are classified as joint fishing waters. The regulation and licensing of fishing in joint waters shall be as stated in 15A NCAC 10C .0106.

*History Note: Authority G.S. 113-132; 113-134; 113-292;
Eff. February 1, 1976;
Amended Eff. January 1, 1977.*

15A NCAC 10C .0105 POSTING DIVIDING LINES

The dividing lines of all major bodies of water and watercourses which are divided by the agreement of the Marine Fisheries Commission and the Wildlife Resources Commission so that portions of the same are constituted inland fishing waters, coastal fishing waters, or joint fishing waters shall be marked with signs insofar as may be practicable. Unmarked and undesignated tributaries shall have the same classification as the designated waters to which they connect or into which they flow. No unauthorized removal or relocation of any such marker shall have the effect of changing the classification of any body of water or portion thereof, nor shall any such unauthorized removal or relocation or the absence of any marker affect the applicability of any regulations pertaining to any such body of water or portion thereof.

*History Note: Authority G.S. 113-132; 113-134;
Eff. January 1, 1977.*

15A NCAC 10C .0106 APPLICABILITY OF REGULATIONS: JOINT WATERS

- (a) All coastal fishing laws and regulations administered by the Department of Environment, Health, and Natural Resources and the Marine Fisheries Commission apply to joint waters except as otherwise provided, and shall be enforced by fisheries enforcement officers.
- (b) The following inland fishing laws and regulations administered by the Wildlife Resources Commission apply to joint waters and shall be enforced by wildlife enforcement officers:
 - (1) all laws and regulations pertaining to inland game fishes,
 - (2) all laws and regulations pertaining to inland fishing license requirements for hook and line fishing,
 - (3) all laws and regulations pertaining to hook and line fishing except as hereinafter provided.

*History Note: Authority G.S. 113-132; 113-134; 113-271; 113-275; 113-292;
Eff. January 1, 1977;
Amended Eff. April 1, 1990; April 15, 1979.*

15A NCAC 10C .0108 SPECIFIC CLASSIFICATION OF WATERS

The several sounds and estuarine and tributary waters all or portions of which are specifically classified as inland, joint, or coastal fishing waters by agreement of the Marine Fisheries Commission and the Wildlife Resources Commission are listed in the regulations of the Marine Fisheries Commission under 15A NCAC 3Q .0200 and such list and classification is incorporated herein by reference, shall include any later amendments, and is made a part of this Section to the same extent as if the same were fully set forth herein.

*History Note: Authority G.S. 113-129; 113-132; 113-134; 150B-14;
Eff. January 1, 1977;
Amended Eff. July 1, 1993; January 1, 1981; January 1, 1978.*

APPENDIX 2

SUBCHAPTER 31 - GENERAL RULES: SECTION .0100 -GENERAL RULES

15A NCAC 03I .0114 RECORDKEEPING REQUIREMENTS

- (a) It is unlawful for a fish dealer:
- (1) To fail to accurately and legibly complete all mandatory items on the North Carolina trip ticket for each transaction and submit the trip ticket in accordance with G.S. 113-168.2;
 - (2) To fail to provide to the Division a completed no transaction form by the tenth day of the following month when no transactions occurred for a month;
 - (3) To fail to keep all trip tickets and all supporting documentation for each transaction including receipts, checks, bills of lading, records and accounts for a period of not less than three years.
- (b) It is unlawful for a seller licensed under G.S. 113, Article 14A or donor to fail to provide to the fish dealer, at the time of transaction, the following:
- (1) A current and valid license or permit to sell the type of fish being offered and if a vessel is used, the commercial fishing vessel registration; and
 - (2) Complete and accurate information on harvest method and area of catch and other information required by the Division.
- (c) It is unlawful to transport fish without having ready at hand for inspection a bill of consignment, bill of lading, or other shipping documentation provided by the shipping dealer showing thereon the name of the consignee, name of the shipper, the date of the shipment, and the quantity of each species of fish shipped. In the event the fisherman taking the fish is also a dealer and ships from the point of landing, all shipping records shall be recorded at the point of landing. Fishermen who transport their fish directly to dealers are exempt from this Paragraph of this Rule.
- (d) It is unlawful to export fish landed in the State in a commercial fishing operation without a North Carolina licensed fish dealer completing all the record keeping requirements in G.S. 113-168.2(i).
- (e) It is unlawful to offer for sale fish purchased from a licensed fish dealer without having ready at hand for inspection written documentation of purchase showing thereon the name of the licensed dealer, name of the purchaser, date of the purchase, and the quantity of each species purchased.
- (f) It is unlawful for a holder of a Fish Dealer's License to have fish in possession at a licensed location without written documentation from a licensed fish dealer or a completed North Carolina Marine Fisheries Trip Ticket to show the quantity and origin of all fish.

History Note: Authority G.S. 113-134; 113-168.2; 113-168.3; 113-169.3; 113-170; 113-170.3; 113-170.4; 143B-289.52; Eff. March 1, 1994; Recodified from 15A NCAC 3I .0014 Eff. December 17, 1996; Temporary Amendment Eff. July 1, 1999; Amended Eff. August 1, 2000

APPENDIX 3

January 9, 2013

THIS IS A REMINDER ABOUT EEL LOGBOOK REPORTING

A logbook reporting system for American eel harvest started on January 1, 2007.

If you fish for American eel using eel pots, participation in this logbook program is a MANDATORY requirement. General Statute 113-170.3 (a) requires SCFL holders to participate in DMF record-keeping requirements: *“licensees may be required to keep additional information of a statistical nature or relating to location of catch as may be needed to determine conservation policy.”*

To comply with the Atlantic States Marine Fisheries Commission (ASMFC) Addendum I to the American Eel Fisheries Management Plan, the Division of Marine Fisheries (DMF) **MUST** conduct mandatory reporting on American eel harvest, including pot soak time and number of pots fished. Soak time and number of pots fished are currently not reported on trip tickets.

Knowing the amount of gear fished and soak time of eel pots is needed to accurately determine American eel catch per unit effort (CPUE). Accurate CPUE data are needed to properly manage this resource for the benefit of the citizens of North Carolina. Logbook data will be the main source of DMF eel harvest information reported to the ASMFC.

It is extremely important you participate and report this information in the most accurate way possible. By completing logbooks as required by law, you will do your part to help manage North Carolina's marine resources. You may be assured of **COMPLETE CONFIDENTIALITY**. Harvest information from your logbook reports will be combined with information of other harvesters and never released individually.

Completed logbook forms will be due on or before the 10th of the following month and can be faxed (252-726-3903), or mailed to the North Carolina Division of Marine Fisheries, P.O. Box 769, Morehead City, NC 28557.

The Division of Marine Fisheries truly appreciates your cooperation with this requirement.

If you have any questions, contact the Division's eel biologist, Garry Wright at (800) 338-7804 ext.3864 or by email at Garry.Wright@ncdenr.gov.

NORTH CAROLINA COMMERCIAL EEL POT LOGBOOK

MONTH/YEAR: _____

FISHERMAN NAME: _____

DATE	NUMBER OF EEL POTS FISHED THIS TRIP	SOAK TIME (number of days pots soaked since last fished)	POUNDS OF EELS	DEALER SOLD TO (Record dealer number and name of dealer on the day your eels are sold)	TRIP TICKET NUMBER (Record the trip ticket number each time a trip ticket is completed for your eels)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

CIRCLE MONTHS YOU WILL NOT BE EELING. (You do not need to submit a report for months circled.)

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Fax (252-726-3903) or mail this report by the 10th of the following month to:

FISHERMAN COPY

NC Division of Marine Fisheries, PO Box 769, Morehead City, NC 28557

**South Carolina Annual Compliance Report for the
2012 American Eel Fishery**



DNR

Prepared by: Allan P. Hazel
South Carolina Department of Natural Resources

September 1, 2013

I. Commercial fishery

A. Synopsis of regulations in place:

Any individual using any gear to harvest any life-stage of the American eel in state waters, either fresh or marine, must obtain a permit by gear type and water area. Individuals harvesting American eel for commercial purposes must also purchase the appropriate fishing license as well as licenses for all gears.

In order to comply with the ASMFC request, that all states cap participation and effort in their elver fisheries at 1997-1998 levels, South Carolina initiated a limited-entry permitting program for the 1998-1999 elver season. A maximum of 10 individuals are issued permits to capture elvers with approved gears. Furthermore, there is a limit on gear per permit. Any permitted dip net can only be operated by the permittee without any mechanical assistance. A maximum of 10 fyke nets can be set under an issued permit, again, with the permittee required to be present during all fishing activity. Permits are issued for specific water areas and all effort and catch are required to be reported in monthly logs of daily activity. The ASMFC's Interstate Fishery Management Plan for American Eel required that states to retain existing or more restrictive commercial fishery regulations for all life stages of American eel. South Carolina complied with this mandate and has continued to cap effort and participation in all commercial eel fisheries.

Individuals are selected for participation in the elver fishery based on the following criteria. Those who held a permit in the previous season, complied with all permit conditions, and who were not convicted of any fishery violations in the preceding year, are automatically issued a permit, provided they applied by 1 November for the upcoming fishing season. Applicants for vacancies created by either forfeiture of permit or disqualification or a prior permittee are selected by a randomized computer drawing, should such be necessary, to limit participation to 10 individuals. A written or verbal request for permit must be received by the 1 November deadline. All elver permits to be issued for the following season (18 November through the following 15 May) are issued by 18 November. Monthly effort and harvest reporting, as well as other aforementioned requirements initiated in 1998, remain in effect today.

All traps or pots used to capture "yellow" or "silver" eels must also be permitted by water area fished. Mandatory report of effort and catch is required for all such activity as described above for the elver fishery. As is the case for permitted elver gear, all by-catch must be released immediately in the waters where such are taken.

The following license fees and other restrictions apply in fresh or marine waters. The regulations were enacted on 1 July 2000.

1. Freshwaters:
 - a. Pots/traps:

There is a \$50 license fee for three or more traps for residents. Residents must also apply of \$5 tag to each trap. Non-residents must pay \$1,000 for three or more pots/traps and a \$50 fee for each tag to be attached to each trap. Pots or traps are prohibited in certain freshwater areas.
 - b. Other gears:

Licensed and permitted as in marine waters. Commercial freshwater license (\$50 residents, \$1,000 non-residents) is required to use any commercial gear.
2. Marine waters:
 - a. Powerboats:

All such vessels operating commercially must display a vessel identification decal, supplied free of charged by the SCDNR.
 - b. Equipment:

Pots/traps: Must possess a misc. trap license (\$25 residents, \$125 non-residents) for the first 50 traps and (\$1 residents, \$5 non-residents) for each additional trap. A saltwater commercial license (\$300 residents, \$425 non-resident) is also required.

Dip net: \$10 each,
Fyke net: \$10 each
 - c. Dealers:

Wholesale License: (\$100 residents, \$500 non-residents)
Saltwater Commercial License: \$25 (allows legal sale only to licensed wholesale dealer).

B. Estimates of directed harvest, by month, by region, as defined by the states.

1. Pounds landed by life stage and gear type (defined in advance by ASMFC):
 - a. Elvers/glass eels: Landings and effort by month.

All individuals who participated in the 2012 fishery received permits to harvest elvers/glass eels. All of the permittees were authorized to use both fyke nets and dip nets. Mandatory monthly reports of effort and catch were included in all permit requirements.

Dip net permittees reported 70 trips and 535.5 hours of effort, producing a total catch of 186 pounds of elvers. Fyke net permittees reported 230 trips and 29528 hours of effort, producing a total catch of 1265 pounds of

elvers. Monthly reported effort was 8985, 11744, and 8799 fyke net-hours for January, February and March, respectively.

- b. Adults (yellow and/or silver eels): Landing and effort by month.

No adult eel landings were reported in South Carolina during 2012.

2. Biological data taken from representative sub-samples to include sex ratio and age structure (for yellow/silver eels), length and weight, if available:

None available

3. Estimated percent of harvest going to food versus bait:

None available

- C. Estimates of export by season (provided by dealers):

All landings of eels were reported above by the mandatory reporting system for permit holders. Eels, either adults or elvers, are not tracked by the South Carolina's wholesaler dealer system.

- D. Harvest data provided as CPUE (by life stage and gear type):

Elvers: Total fyke net hours: 29528
 Total pounds harvested: 1265.61
 CPUE = 0.043 lbs/net-hr

 Total dip net hours: 535.5
 Total pounds harvested: 186.22
 CPUE = 0.35 lbs/net-hr

Adults: Total eel pot hours: 0
 Total pounds harvested 0
 CPUE = 0 lbs/net-hr

E. Permitted catch for personal use, if available:

No data available

F. Request for *de minimis* status:

The state of South Carolina wishes to request *de minimis* status based on data for the past two years showing commercial landings have totaled 1451.88 lbs annually.

II. Recreational fishery

A. Synopsis of regulations in place:

The American eel is considered a non-game species for which there are no creel, closed season, possession or length limits in either fresh or marine waters. Eels may be taken by hook & line (other approved recreational gears such as cast nets), trot-line, trap or pot. Eel pots used in freshwaters must conform to dimensions as applied to commercial eel pots as follows: pot size may not exceed 24" x 48", mesh size not less than 1/2" square and throat opening not to exceed 2" in any direction. No more than two recreational eel pots may be fished per individual in freshwater. A \$10 fee is required for using one or two traps. Each pot also requires a \$5 tag. All traps used in freshwaters must be marked with solid buoys bearing the name and address of the fisherman. South Carolina law does not allow the use of recreational eel pots in marine waters. Beginning in the 2012 fishing season all individuals using gear types deemed as commercial must obtain a permit by gear type and water area.

B. Estimate of recreational harvest by season (if available):

No such data are available. American eels are rarely targeted in the State by recreational fishers. They are considered as by-catch and are generally released.

1. Biological data taken from representative sub-samples to include sex ratio, age structure, length and weight (if available):

No such data have been collected.

III. Fishery-independent monitoring

A. Results of the Annual Young-of-Year Abundance Survey (unless exempt):

A young-of-year survey was conducted in 2012 as prescribed by the ASMFC. A single sample site was selected due to logistical and personnel constraints. The selected site is in upper Goose Creek Reservoir (GCR), a tributary of the Cooper River. The site is immediately below the dam and spillway of Goose Creek Reservoir in Berkeley County, South Carolina. The sample site is 15 river-km from Goose Creek's confluence with the Cooper River, which is 25 river-km from the Atlantic Ocean. Historically, the Cooper River has been the major producer of the elver/glass eel harvest in the state.

Sampling was conducted using a staked fyke-net for a seven-week period, with samples collected four days per week from 21 February through 12 April, 2012. The fyke-net was staked with the trap end upstream and with wings extended from one bank to approximately two-thirds stream width. The gear was staked in a position where the major portion of the elver run is believed to pass and in a manner by which the entire water column is fished. Catches ranged from 0 to 23 elvers per set, with a mean catch of 3.2 specimens per ~24-hr set (Table 1).

This year was an atypical year. There was little to no flow over the dam at Goose Creek Reservoir for the early part of the year. When a high flow event occurred in early March, the sampling gear was damaged by high water and wind, resulting in a week of lost sampling. The total catch over the sampling period was 80 YOY.

The sampling protocol calls for two samples/week of up to 60 elvers, to be individually weighed, measured and examined for pigment stage. During 2012 because of little freshwater discharge only 29 elvers were sampled. The actual discharge rate was not measured. Instead, reservoir pool height was recorded near the spillway and used as a proxy for discharge. Moon phase was also recorded for each sample date.

Daily effort, pool height, water temperature, catch and CPUE data are presented in Table 1. Both daily elver catch and catch per unit of effort (CPUE) displayed overall decreasing trends during the sample period which may indicate that the peak of the run may have been before sampling began (Figures 1 and 2). The highest average daily catch rates were observed during February. The 2012 elver run did not appear to display any obvious relationship to lunar phase, tidal

amplitude, water temperature, or discharge rate from the reservoir (Figures 1, 2 and 3).

Mean pigment stage of elvers displayed an increasing trend during the survey period (Figure 4). In addition, both mean length and weight of elvers by week displayed overall decreasing trends through the survey period (Figures 5 and 6). A length (total length) frequency distribution was generated for the specimens that were individually sampled (Figure 7). Mean elver length through the survey period ranged from 59.49 to 53.54 mm with a season mean of 56.32 mm (Table 2).

Conclusions based on these data would be highly subjective and suspect since this study represents only one site in one river in South Carolina. The American eel is one panmictic population, significant management actions will have to be considered on the whole range of the species. Broad comparisons were not made between the results of this twelve year survey but these data are provided to be pooled with coast wide data being collected to better understand the ingress of young of year elvers (Figure 9).

B. Description of other fishery-independent surveys performed (methods, locations, etc.):

Experimentation in collection/upstream passage feasibility of elvers at St. Stephen Dam on the Rediversion Canal, Santee River at river-km 92 was conducted using two ladder designs in a side-by-side comparison. One ladder was constructed of 46 cm wide by 15 cm high by 3.6 m long aluminum electrical raceway trays; the other was constructed of 15 cm diameter corrugated polyethylene drainage pipe. Both ladders were lined with a landscape erosion fabric, and fed a continuous supply of running river-water. The ladders were operated from 3 January – 23 July 2012. During this period of ladder operation water temperature ranged from 9.9 – 29.7 C. Collection dates were irregular, however, a total of 17481 eels were collected. A length (total length) frequency distribution was generated from all specimens collected from both ladders (Figure 8). Collection dates and mean lengths are presented in Table 3.

Because of problems with equipment failure, limited water flow, and the lack of replicates no conclusions can be made at this time from the experimental ladders, however, trials will continue next season in order to develop an elver passage protocol for the St. Stephen Dam.

C. Projects planned for the next five years:

The mandated annual young-of-year abundance survey will be conducted each year over at least the next five years in the same location at Goose Creek unless instructed otherwise. No other sampling projects are planned at this time.

IV. Characterization of other losses:

No other losses are recorded; however, American eel mortalities are known to occur from impingement and entrainment at various water intake facilities. Numerical records for such mortalities are not available. Finally, an unknown number of eels are killed annually by recreational anglers but we cannot quantify this source of mortality either.

Table 1. 2012 elver fyke-net catch records for upper Goose Creek

Date	Net-hrs	Water Temp (°Cel)	Pond Height (cm)	Elver Catch	CPUE (elvers/fyke net-hr)
02/21/2012	31.00	15.5	31.00	1	0.032
02/23/2012	25.00	18.0	17.25	8	0.320
02/24/2012	24.00	19.5	17.50	23	0.958
02/28/2012	26.50	15.0	18.00	0	0.000
02/29/2012	23.00	16.0	18.00	5	0.217
03/01/2012	24.50	18.0	18.00	3	0.122
03/02/2012	24.75	19.0	18.50	2	0.081
03/09/2012	21.75	18.0	21.00	11	0.506
03/13/2012	27.00	17.5	19.00	4	0.148
03/14/2012	24.75	18.5	19.00	11	0.444
03/15/2012	28.50	23.5	18.50	0	0.000
03/16/2012	22.00	21.5	18.00	1	0.045
03/20/2012	31.00	23.5	18.00	1	0.032
03/21/2012	24.00	25.0	18.00	1	0.042
03/22/2012	24.25	24.0	17.00	5	0.206
03/23/2012	24.00	27.0	17.50	0	0.000
03/27/2012	26.00	19.5	18.50	1	0.038
03/28/2012	27.00	22.0	19.00	1	0.037
03/29/2012	18.00	21.0	18.50	1	0.056
03/30/2012	26.00	22.0	18.00	1	0.038
04/03/2012	30.50	24.5	16.75	0	0.000
04/05/2012	48.00	28.5	16.75	0	0.000
04/10/2012	26.50	21.0	19.00	0	0.000
04/11/2012	24.00	21.0	17.50	0	0.000
04/12/2012	23.00	18.0	17.00	0	0.000
SEASON	Sum = 655	Range	Range	Sum =80	Mean = 0.133
(totals/means)	Mean = 26.20	15.0-28.5	16.75-31.00	Mean = 3	

Table 2. Weekly means for total length, weight, and pigment stage for elvers taken by fyke net below Goose Creek Reservoir, 21 February – 12 April 2012,

Sample Date	Sample No.	Length (mm)	Weight (g)	Pigment Stage
14 Mar - 15 Mar	21	59.49	0.16	2.86
23-Mar	4	55.94	0.15	2.50
27-Mar	4	53.54	0.11	3.25
Season	29	56.32	.014	2.87

Table 3. Number and mean length of elvers collected in 2012 by date and water temperature in two experimental elver ladder designs as St. Stephen Dam, South Carolina.

Type collector	Dates	Range in Temp (C)	Mean Temp (C)	Catch (N)	Range of Catch	Mean Catch	Range in Total Length (mm)	Mean Total Length (mm)
Aluminum	1/03/12 -7/23/12	9.9 – 29.7	21.0	11379	0 - 1760	138.8	48-170	91
Polyethylene	1/03/12 -7/23/12	9.9 – 29.7	21.0	6096	0 - 638	74.3	53-153	91

Figure 1. Daily elver catch, water temperature vs. moon phase for 2012 GCR survey.

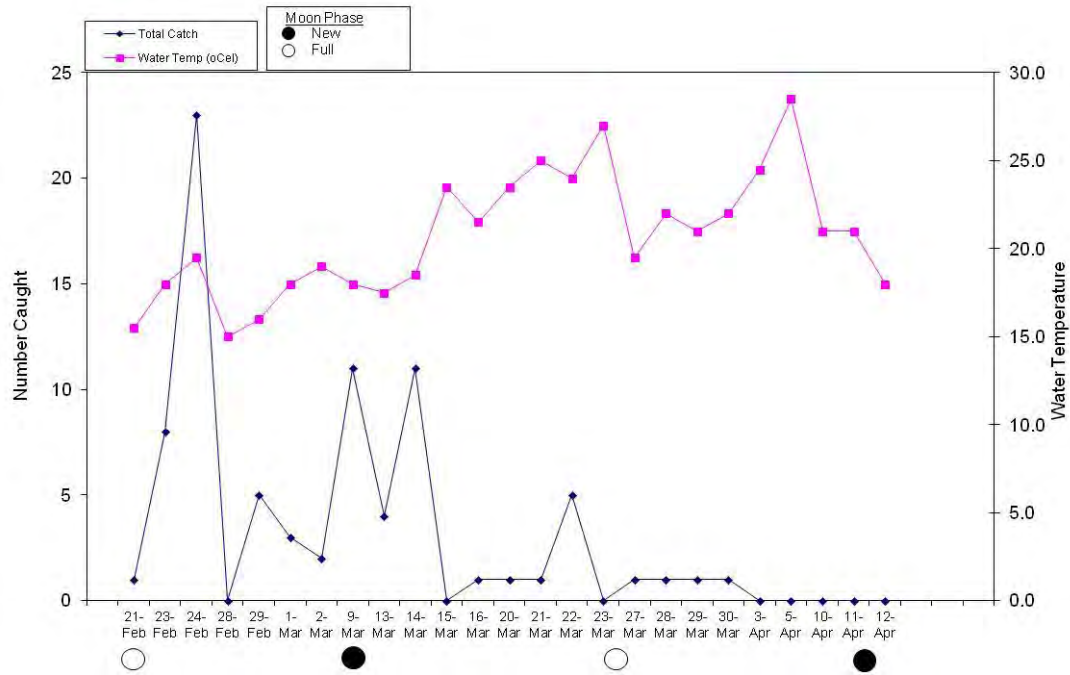


Figure 2. Daily water temperature vs. catch per unit of effort for 2012 GCR survey.

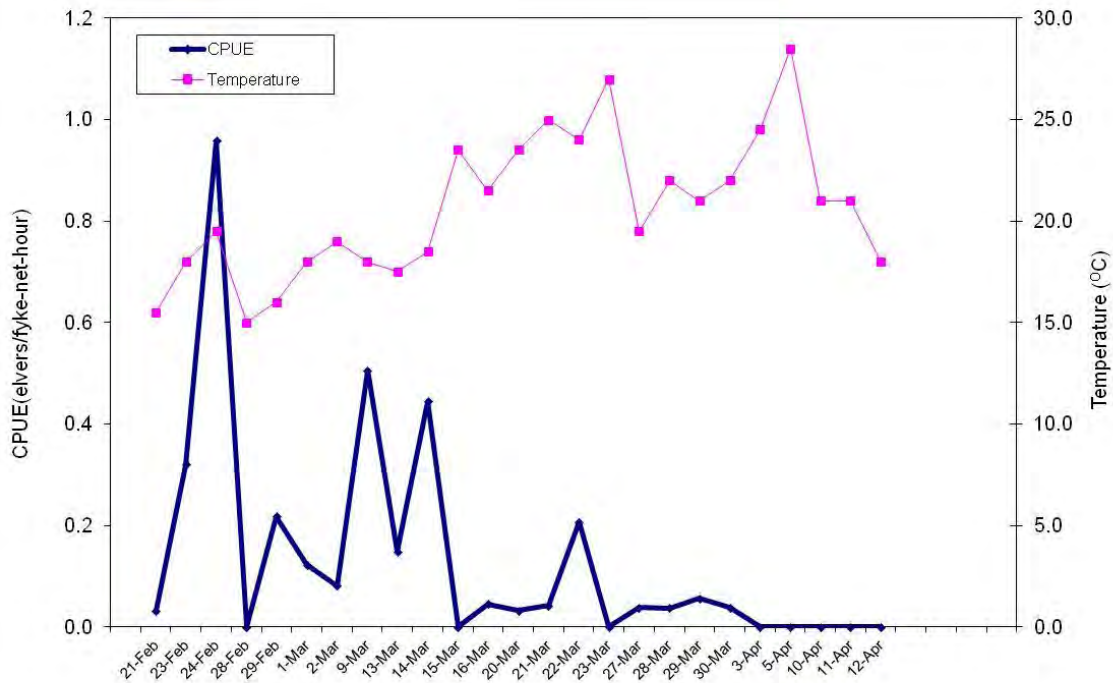


Figure 3. Daily elver catch (n) vs. reservoir pool height (cm) for 2012 GCR survey.

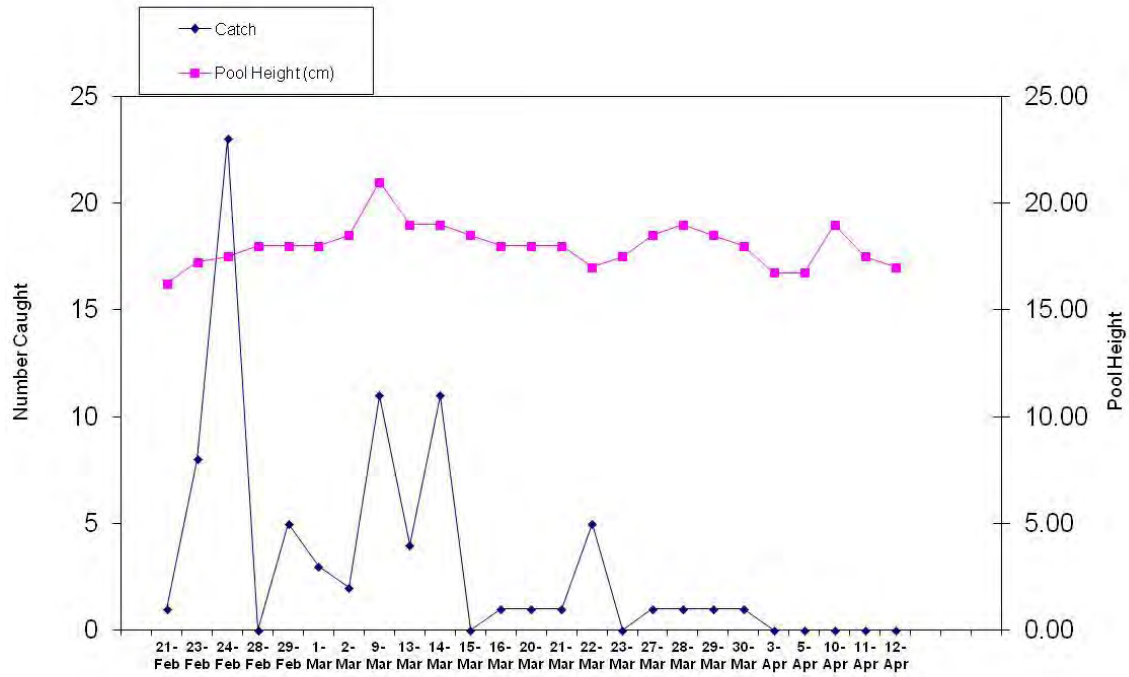


Figure 4. Mean pigment stage by week for 2012 GCR elver survey.

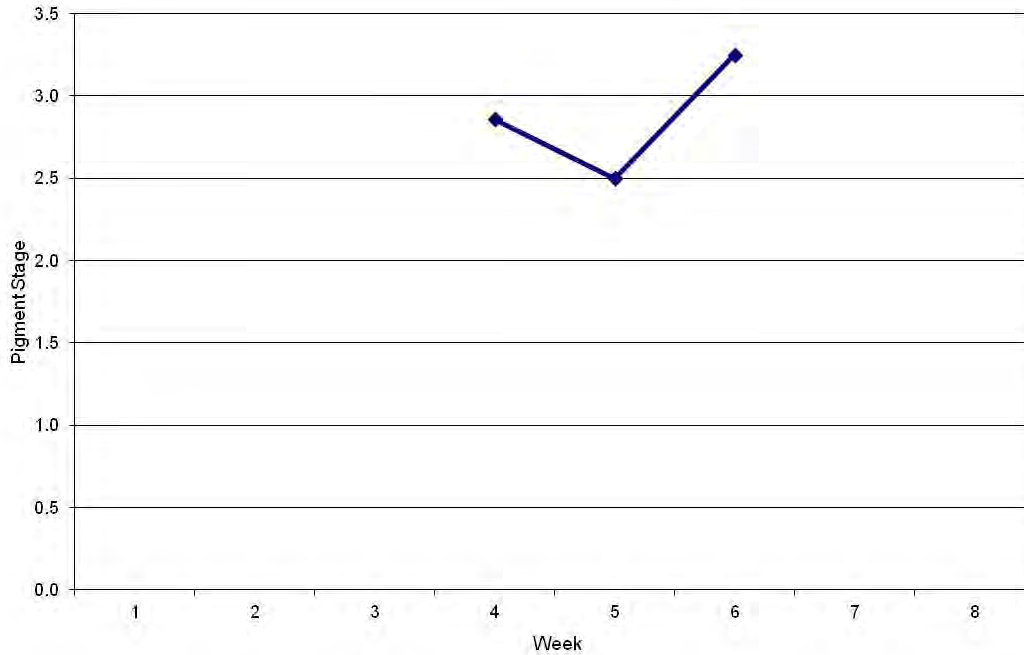


Figure 5. Mean total length (mm) of elvers by week for GCR 2012 survey.

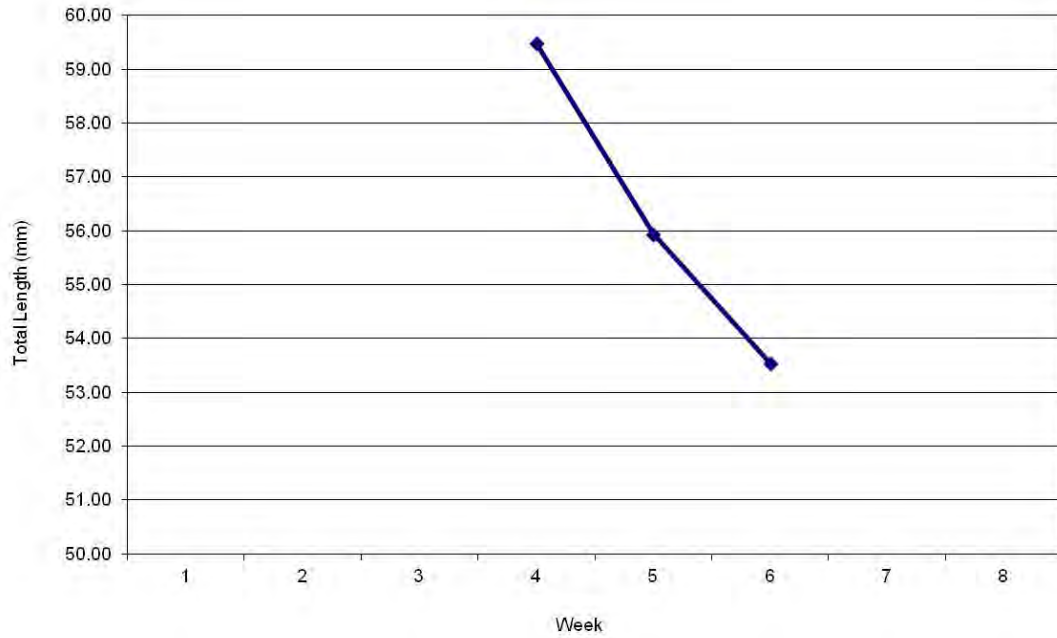


Figure 6. Mean weight (g) of elvers by week for GCR 2012 survey.

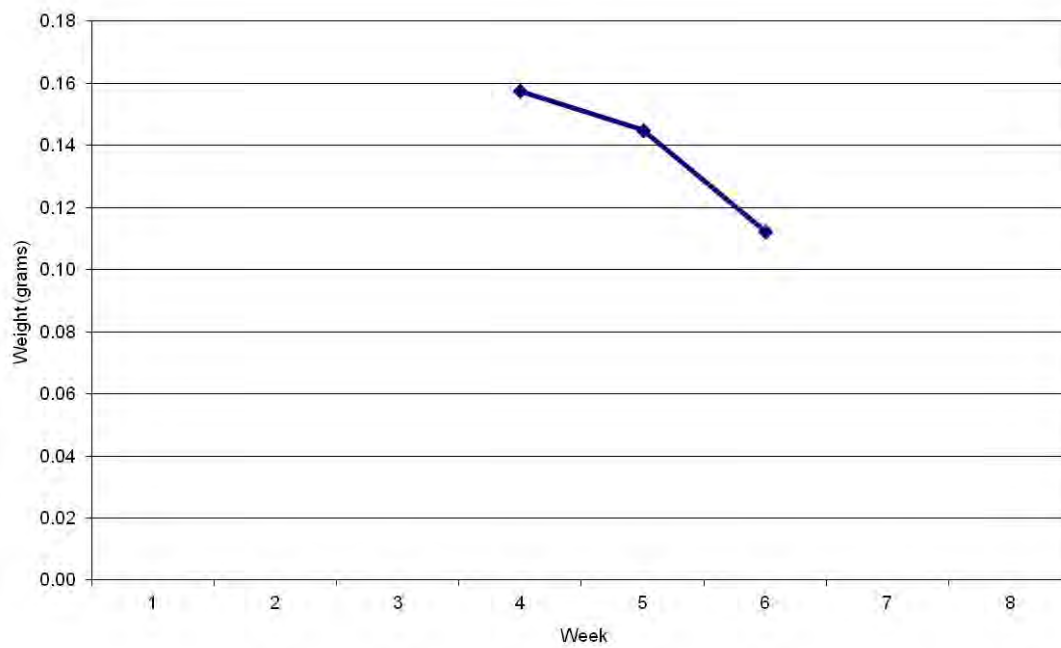


Figure 7. Length-frequency distribution for elvers collected by fyke net at the GCR in 2012.

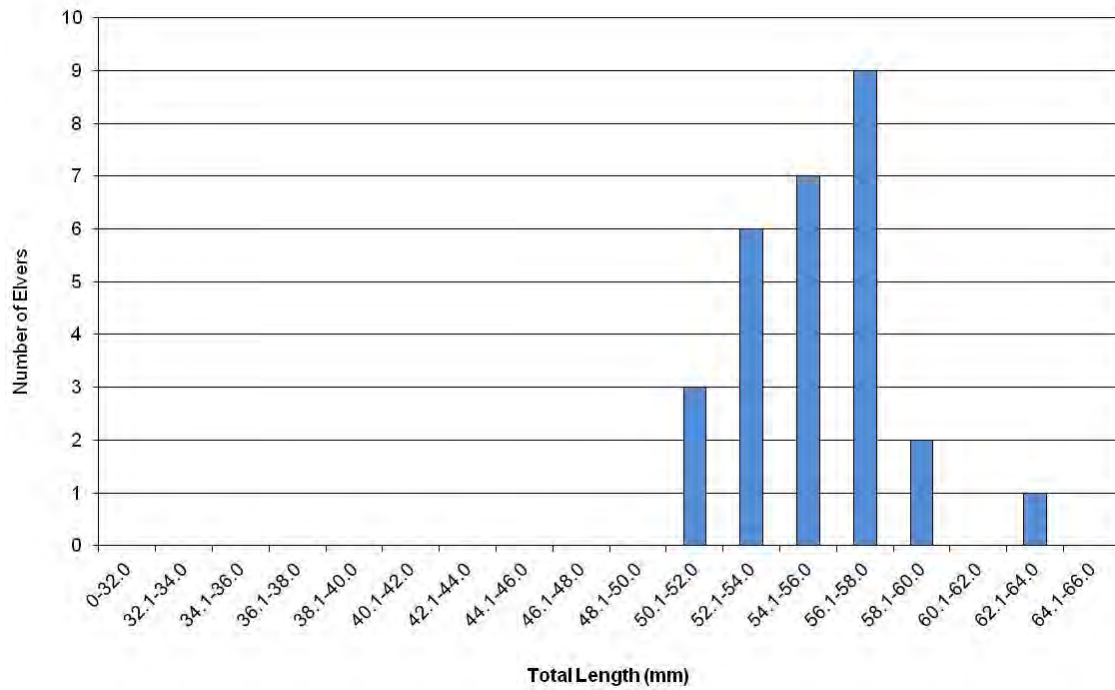


Figure 8. St. Stephen dam length frequency distribution for elvers in 2012.

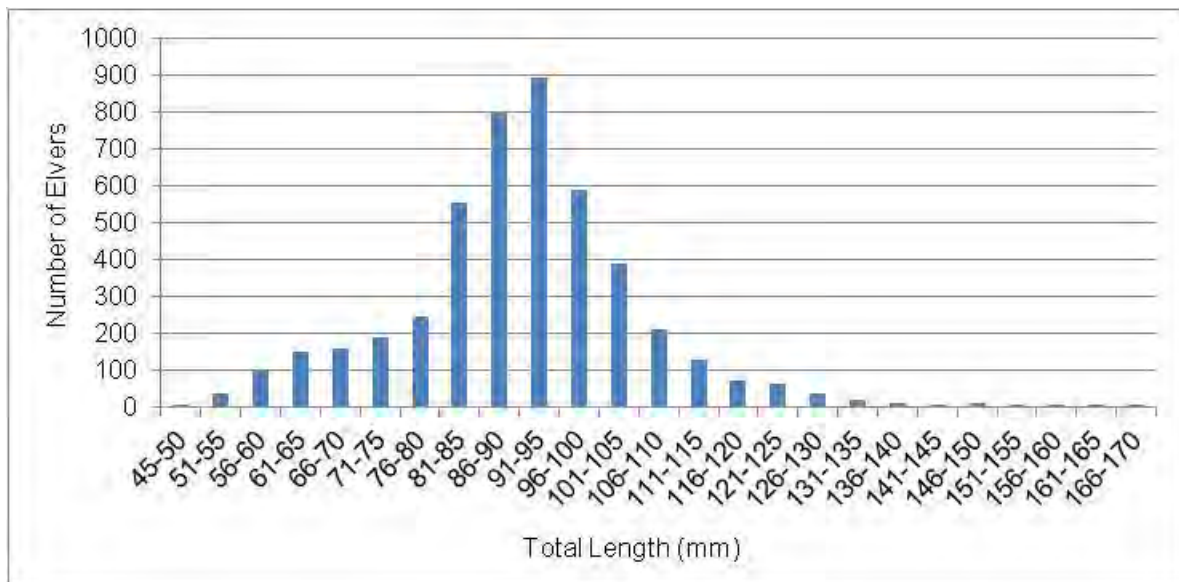
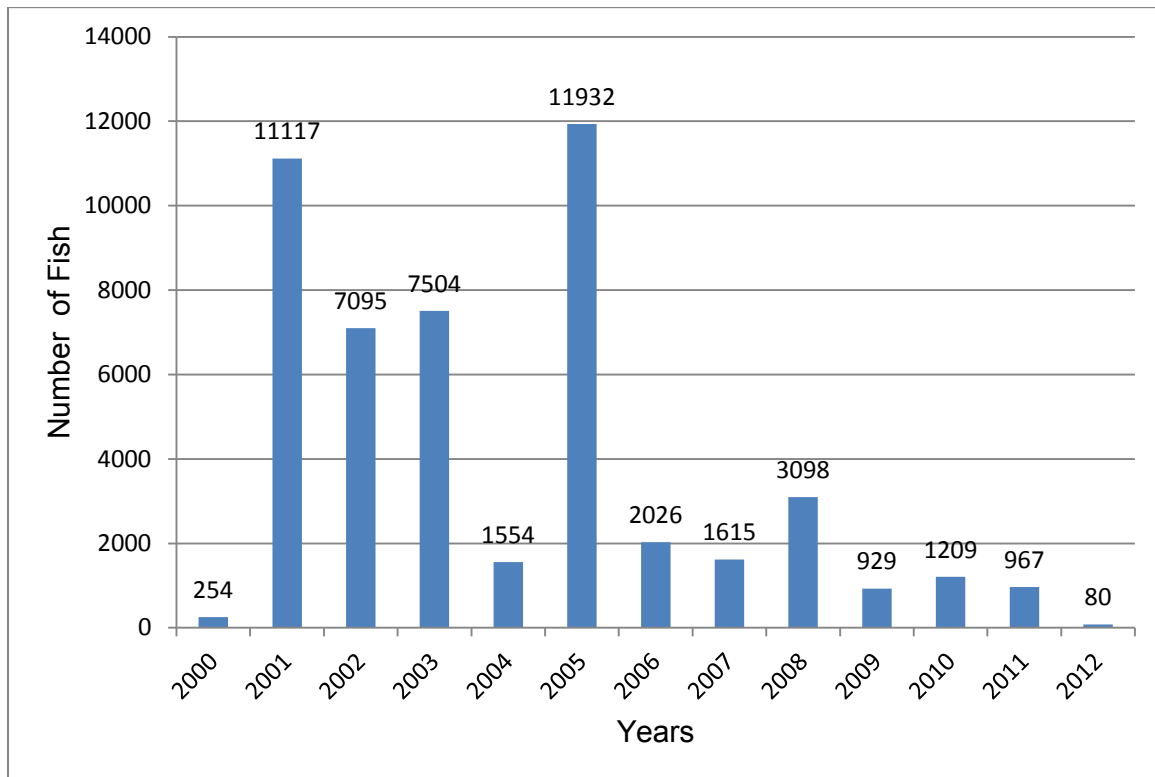


Figure 9. Annual catch of elvers in fishery independent survey at Goose Creek Reservoir, South Carolina 2000-2012





MARK WILLIAMS
COMMISSIONER

A.G. 'SPUD' WOODWARD
DIRECTOR

August 28, 2013

Kate Taylor
Atlantic Menhaden Fisheries Management Plan Coordinator
1050 N. Highland St., Suite 200 – A-N
Arlington, VA 22201

Kate:

Enclosed please find the Annual Compliance Report for American Eels as submitted for the State of Georgia. As in previous years we are continuing to request *de minimis* status.

Please contact me if any additional information is needed.

Sincerely,

Jim Page
Coastal Resources Division

Interstate Fishery Management Plan for American Eel 2013 Compliance Report - Georgia

In accordance with Section 5.1.2 of the Interstate Fishery Management Plan for American Eel, State Reporting and Compliance Schedule, the State of Georgia submits the following report for 2012.

1. Commercial Fishery

a) Synopsis of regulations in place:

- Regulatory Authority: O.C.G.A. Section 27-4-71 and Board Rule 391-2-4-.01
- Season: All Year
- Minimum Length: Six inches (6")
- Trip limit: None
- Gear: Pots - The muzzle of throat opening must be round and have a diameter of no greater than two inches. The mesh size may be no smaller than 1" by ½". Rectangular pots may be no larger than 24" x 24" x 15"; cylindrical pots may be no larger than 15" nor smaller than 9" in diameter and no greater than 36" in length. All pots must have a tag attached bearing the name, address, and license number of the person using the gear.
- Area: Any salt waters of Georgia except those restricted as specified in Board Rule 391-2-4-.01.
- License Requirement: Valid personal commercial fishing license and commercial fishing boat license.
- Reporting Requirement: All commercial seafood harvesters are required to submit landings reports to the Department of Natural Resources, Coastal Resources Division (CRD). These requirements are described in the commercial fishery monitoring section below.

b) Estimates of directed harvest.

1. All Georgia commercial eel landings are considered confidential due to the low number of dealers who report eel harvest. The directed commercial fishery for eels in Georgia is typically small. During the 2012 fishing season, eels were reported landed. Landings for the ten-year period, 2002 - 2012 have averaged less than 500 lbs. annually. Because Georgia's commercial minimum size limit is six inches, only non-elver (yellow or silver) eels can be legally harvested, and, therefore, are managed as one life stage.
2. No biological data were collected in 2012 due to limited fishing effort.
3. In past years, the majority of eels sold through dealers were for human consumption. No eels were reported bought or sold for use as bait during 2012.

c) Estimates of export by season. There were no reported exports of eels harvested from Georgia waters.

d) Harvest data provided as CPUE. N/A

e) Permitted catch for personal use, if available. N/A

2. **Recreational Fishery**

a) **Synopsis of Regulations in Place.** There is very little documented recreational harvest of American eels from Georgia waters. During 2012, there were no harvest regulations in effect.

b) **Estimate of recreational harvest by season.**

According to the Marine Recreational Information Program (MRIP) survey estimates for Georgia, , an average of 21,723 eels were caught (PSE's 21-89) and, of those, 21,583 eels (99%) were released annually during the ten-year period from 2003-2012. During this time period, eel harvest (as bait) was documented only during one year - 2003 (560 eels). Data for the other years during that time period indicate that all eels caught were released alive. Data expansions for 2012 were based on 1,826 interviews from March through December. Of these, 6 anglers on six trips responded as having caught 6 eels, all of which were released alive. Due to the fact that no eels were observed in the creels, no biological samples were taken.

Additional recreational creel census data comes from the Altamaha and Satilla Rivers collected by the Wildlife Resources Division (WRD) of Georgia DNR. Information collected generally includes number and sizes harvested as well as location and disposition of the catch. During this reporting period, expanded estimates for the Altamaha River indicate that 118 eels were harvested and 940 caught and released alive. No eels were captured in data collection efforts in the Satilla River.

3. **Fishery-independent Monitoring**

a) **Results of the Annual Young-of-the-Year Abundance Survey.**

Methods

Sampling for elvers was conducted per the ASMFC American Eel Technical Committee: Standard Procedures for American Eel Young of the Year Survey (standard procedures). Two fixed sampling stations, originally selected following criteria set forth by the standard procedures, were sampled. Sample Site One is located in a small stream, which over one hundred years ago was modified in an effort to be used as a canal. It originally connected a railroad with one of Georgia's largest rivers, the Altamaha, which drains the state's interior. Sample Site Two is a small branch of Hudson Creek, which drains into the Altamaha River Delta (Doboy Sound). Fyke nets, first chosen because of their ability to adequately cover the width, depth, and tidal amplitude of the sample site, were used as sampling gear. The fyke net was secured in the creek with the cod end facing upstream so as to cover the entire width of the stream to fish at all tide stages. Once set, the fyke net was fished/sampled four days per week for a minimum of six weeks. The aforementioned standard procedures require states to time sampling to coincide with onshore migrations, which in the southernmost Atlantic states typically occurs in winter and spring. Staff examined data from previous years

and began sampling efforts in early January to maximize the probability of sampling during the peak of elver onshore migration.

The following data were collected during each sampling event: total number of eels caught, bycatch caught, CPUEs (to the nearest 0.25 hours), water temperature (°C), dissolved oxygen (mg/L), salinity, moon phase, and a gear performance rating (1-4 good, fair, poor, void). Biological sampling of total length (nearest 0.5 mm), weight (nearest 0.01g), and pigmentation stage were conducted on up to thirty individual eels/day/site. Assignment of pigmentation stages followed a scale provided by Haro and Krueger (1988).

Results and Discussion

The State of Georgia responsibility is collection and delivery of recruitment data, along with submission of an annual American eel ISFMP compliance report to ASMFC. All analyses of the data used for determining stock recruitment of the American eel to the U.S. Atlantic coast are performed by ASMFC.

Sampling Effort

The 2012 YOY American eel survey began in January and concluded six weeks later in mid-February. A total of 26 sampling events were successfully completed during which a total of 135 elvers and 4 yellow phase eels were collected. At least fourteen different species of bycatch were recorded, with a combined weight of 10.98 kg. Elvers ranged in total length (TL) from 42 mm to 62 mm and exhibited a mean TL of 51.45 mm. The weight of elvers ranged from 0.03 grams to 0.16 grams, exhibiting a mean weight of 0.08 grams. The modal pigmentation stage of sampled elvers varied and ranged from stage 1 to stage 5. Table 1 shows the total number of elvers, average lengths and weights, and ranges of lengths and weights as observed annually since 2000.

Table 1. Total number of elvers captured annually by site and collectively, including summarized info on lengths and weights of recorded elvers.

Fishing Season	Altamaha Canal	Hudson Crk.	Total Elvers	Lengths (avg)	Lengths (min)	Lengths (max)	Weights (avg)	Weights (min)	Weights (max)	Geometric Mean (# elvers/trap hr)
2000-01	424	N/A	424	53.30	46	59	0.11	0.06	0.18	0.414
2001-02	41	N/A	41	52.01	43	58	0.10	0.05	0.17	0.035
2002-03	112	118	230	52.63	44	62	0.11	0.06	0.2	0.073
2003-04	36	8	44	51.70	47	58	0.10	0.05	0.14	0.017
2004-05	22	330	352	51.72	45	63	0.11	0.05	0.24	0.105
2005-06	217	26	243	52.22	42	62	0.11	0.05	0.19	0.083
2006-07	49	289	338	52.34	44	67	0.10	0.03	0.44	0.104
2007-08	43	16	59	52.62	45	68	0.11	0.03	0.34	0.035
2008-09	1	2	3	56.33	49	63	0.13	0.09	0.21	0.002
2009-10	4	1	5	50.00	47	55	0.11	0.09	0.14	0.005
2010-11	42	5	47	52.87	48	60	0.12	0.03	0.17	0.033
2011-12	79	56	135	51.45	42	62	0.08	0.03	0.16	0.070
All Seasons	1070	851	1921	52.27	42	68	0.10	0.03	0.44	0.066

b) Description of other fishery-independent surveys.

WRD also conducts annual surveys of Georgia streams. In 2012, the Stream Survey Team (SST) completed 61 sampling events in 57 different creeks (Table 2). These creeks were associated with 5 different river basins (Flint, Ocmulgee, Oconee, Ogeechee, and Savannah). A total of 25 eels were captured during these efforts (Oconee River basin yielded 16 eels; Savannah River basin yielded 9 eels).

Year	No. of Streams Sampled	Total No. of Eels Sampled
2000	5	219
2001	13	49
2002	N/A	N/A
2003	59	3
2004	N/A	N/A
2005	18	8
2006	36	154
2007	N/A	N/A
2008	64	329
2009	61	52
2010	47	2
2011	1	0
2012	61	25

4. Characterization of Other Losses

There are five river basins in Georgia that drain into the Atlantic Ocean; the Savannah, Ogeechee, Altamaha, Satilla, and St. Marys. Some, such as the Savannah River, are impounded and highly industrialized in areas. Others, like the Satilla, are most impacted by agricultural and municipal activities.

Table 3 identifies the revocable licenses issued by CRD since 2008. A revocable license is issued for the use of publicly owned submerged lands lying below the ordinary high water mark. Permission is required for any activities, permanent or temporary, that impact salt marshes, intertidal areas, mud flats or tidally influenced water bottoms, including residential and community dock construction, marina construction and operation, Coastal Marshland Protection Committee (CMPC) activities, projects requiring Letters of Permission (LOP), dredging, and shoreline stabilization. Although these projects affect the shorelines of the estuarine waterways upon which they are built, their effect on migrating eels is unknown. CRD staff also review and comment on larger projects, such as the Savannah Harbor Expansion and Naval maritime facility expansions. CRD staff will continue to work closely with the U.S. Army Corps of Engineers, Georgia Ports Authority, U.S. Fish and Wildlife

Service, and the National Marine Fisheries Service to insure fisheries impacts are avoided or minimized.

An important function of the Georgia Coastal Management Program (GCMP) is to ensure federal projects affecting coastal resources are consistent with the enforceable policies of the state. The GCMP also works to maintain and to improve customer service regarding consolidation, coordination, and timeliness of processing revocable licenses for private recreational docks and shoreline stabilization.

	Dredging	Bank Stab.	Community Docks	Private Docks
2012	26	28	17	125
2011	12	36	26	119
2010	16	36	29	132
2009	6	34	19	131
2008	5	36	15	175

Several years ago CRD entered into an oyster reef restoration & enhancement partnership with the University of Georgia Marine Extension Service, and this partnership continues today. Together, CRD and MAREX have established multiple collection sites along the coast where the public can donate oyster shells for recycling. The oyster shells are then prepped and bagged for use in creating or enhancing oyster reefs. Oyster reefs are considered essential fish habitat and their enhancement has numerous benefits. Over the years several oyster reefs have been created or enhanced as a result of these efforts. During this report period, oyster cultch material and oak limb bundles have been deployed in the inter-tidal zone to restore/enhance one Recreational Shellfish Harvest Area in Glynn County Georgia.

5. Request for Continued *de minimis* Status

In accordance with section 4.4.2 of the American Eel ISFMP, this report documents justification for continuation of *de minimus* status. The American Eel ISFMP defines *de minimis* status based on a 1% threshold of average coast wide commercial landings over a two-year period. The State of Georgia wishes to continue its *de minimus* status based on the fact that there were minimal or no amounts of eels commercially landed in Georgia in each of the past two years.

**ANNUAL AMERICAN EEL, *Anguilla rostrata*, COMPLIANCE REPORT TO
THE ATLANTIC STATES MARINE FISHERIES COMMISSION
FOR FLORIDA, 2012-2013**

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September 1, 2013**

I. INTRODUCTION

This annual report is submitted to the Atlantic States Marine Fisheries Commission (ASMFC) by the Florida Fish and Wildlife Conservation Commission (FWC) to fulfill requirements set forth by the American eel *Anguilla rostrata* management plan. It includes the results of juvenile eel monitoring (as identified in Section 3.4.1 of the Fishery Management Plan for American Eel) and an analysis of commercial eel harvest data collected through 2012, as well as a review of current regulations.

Fishery Dependent Monitoring-Commercial Fishery

Prior to July 1, 2006, only fishers harvesting American eel in Florida's freshwater systems using horseshoe crabs *Limulus polyphemus* as bait were required to hold a permit (Chapter 68B-46 of the Florida Administrative Code, F.A.C.) in order to comply with the ASMFC Horseshoe Crab Management Plan. This permitting system exempted American eel harvesters from the daily 25 horseshoe crab harvest and possession limit. The permit allowed for the harvest of 100 horseshoe crabs per day with no possession limit while fishing for American eel in freshwater habitats. These fishers were also required to possess a commercial freshwater fishing license. Currently, all individuals must obtain a permit to commercially harvest American eels from freshwater habitats, regardless of the bait used. Although the same exemptions apply for those using horseshoe crabs as bait, this new permitting system allows for better monitoring of the total American eel harvest in Florida's freshwaters.

A total of 8 to 47 permits has been issued each year since FY2000, the first year of the permit program (Table 1). Permitted eel harvesters have been surveyed for harvest information each year, but prior to FY2006, this information was only collected for harvesters using horseshoe crabs as bait. In FY2003-2005, additional information was requested and included

number of pots deployed each month, percentage of harvested eels that were sold for food versus bait, and type of markets to which eels were sold (in-state vs. out-of-state). Since FY2006 when the new permitting system was implemented requiring all commercial harvesters to obtain permits, these data have been submitted on a trip-level basis and via a monthly sales summary form.

Fishery Independent Monitoring

Between July and December 2001, potential sites for sampling young-of-year (i.e., glass) and other juvenile American eels were surveyed in and around the St. Johns River basin with particular emphasis placed on the Jacksonville, Florida area. Several sites along or near the Intra-coastal Waterway, as far south as Titusville, Florida, were surveyed. To date, Guana River and Rodman Dams are the only sites where significant numbers of juvenile eels can routinely be collected. Other non-obstructed sites (i.e., those without dam structures) have been sampled by fyke net and Australian rope pot, but these efforts have yielded few eels.

A previous search of American eel literature revealed no documentation for the timing of the juvenile American eel run(s) in Florida's estuaries and streams. Biologists from Atlantic states were surveyed in 2000 as to when juvenile eel runs occurred in their states. Based on this survey and the results of 2001 juvenile eel sampling from the Guana River and Rodman Dams, the initial sampling period was set. In 2002, juvenile eel sampling began on February 1 and terminated on March 31, 2002 at both the Guana River and Rodman Dams. Following an evaluation of these results, sampling was started two weeks earlier in 2003 (January 17 - March 21, 2003) and even earlier in 2004 (January 5 - March 28, 2004). Since 2005, the sampling period has run eight weeks, from early January through late February. Juvenile eels were sampled by dip net at the Guana River Dam and, in some years, by lift net at the Rodman Dam.

The results of sampling efforts are reported in the Fishery Independent Monitoring section of this compliance report.

Adult eels were collected from 2001–2006 to determine sex ratios, lengths, weights, and the prevalence of swimbladder parasites. Several adult eels were collected by electrofishing from the St. Johns and Ocklawaha Rivers from December 2001 to April 2002. Representative samples were also obtained from the upper, middle, and lower St. Johns River commercial harvest in 2002. From 2003-2006, only eels captured by the commercial fishery were collected, and these individuals were harvested from November through March during the peak harvest season in Florida. Most eels were euthanized prior to taking measurements or samples; however, in some months, additional length data were collected from live individuals that were then released back into the harvester's holding tanks. This allowed us to increase our sample size without having to purchase additional eels from the harvesters. For those sacrificed, otoliths were removed and archived for future age and growth analysis. Gonad samples were also collected in 2005 and 2006 and stored in 10% buffered formalin for histological processing. In 2006, the swim bladders of each individual were examined for the presence or absence of swimbladder parasites. Samples of parasites found were preserved in 10% buffered formalin and later identified.

II. Request for *de minimis* Status

Florida was granted *de minimis* status for its commercial American eel fishery for 1999-2012, but given recent landings data, Florida is no longer requesting *de minimis* status for its commercial eel fishery.

The documented annual American eel harvest in Florida is small. Based on data obtained from commercial fish houses and/or harvesters, landings have steadily declined since the early

1990s and continue to remain low (Figure 1; Table 1). During the period when horseshoe crab permits were required (July 2000-June 2006), the annual number of permits remained low and ranged from 8 to 29. However, because not all commercial eel harvesters were required to obtain a permit, these data were likely misrepresenting actual eel harvest. In 2004 and 2005, both non-permitted harvesters and out-of-state dealers were contacted. This information suggested that eel landings in the state were much higher, perhaps as much as four times the level reported in earlier years. Thus, a new permitting system was implemented on July 1, 2006, which requires all commercial eel harvesters to submit trip-level catch and sales data to FWC on a monthly basis, regardless of the bait used. Since that time, the number of issued permits has ranged from 11 to 47 per year (Table 1).

III. Current Fishery and Management Program

1. Commercial Fishery

a. Synopsis of regulations currently in place:

In accordance with F.A.C 68A-23.015(2), persons licensed in accordance with Section 372.65(1), F.S., may take eels as specified in Rule 68A-23.002, 68A-23.003, or 68A-23.004, F.A.C., only under permit from the Commission. Permits shall be subject to such terms, conditions and restrictions as prescribed therein and shall be issued, denied, renewed or revoked as provided in Rule 68A-5.004, F.A.C. Eel harvest permits shall be issued to applicants who have submitted a completed eel harvest permit application. Eel Harvest Permit Application Form EHPA-1 (7-06) is incorporated herein by reference and obtainable at the Commission's Tallahassee and Regional Offices (refer to Appendix A).

As written in the Florida Administrative Code (F.A.C.) 68A-23.003, persons licensed under Florida Statute (F.S.) 372.65, may use certain commercial fishing devices only in the manner specified in this rule. Any game fish taken by these devices shall be immediately returned to the water unharmed.

American eel traps and pots:

(a) Species to be taken - Non-game fish may be taken from the waters of the state with eel traps or pots having one inch by one-half inch wire mesh.

(b) Eel traps and pots, in addition to having a one-inch by one-half inch wire mesh, shall be of the following types and specifications:

1. Square “Carolina” pots

a. Maximum dimensions - 24 inches by 24 inches by 18 inches.

b. Maximum diameter of any and all funnel openings - two inches.

2. Cylindrical “shotgun” -type pots

a. Maximum dimensions - four feet by 18 inches.

b. Maximum diameter of any and all funnel openings - two inches.

(c) Licenses

1. The fee for a resident commercial fishing license, which permits a resident to take freshwater fish and frogs by any method prescribed by the Commission and sell such fish and frogs, shall be \$25.00.

2. The fee for a resident freshwater fish dealer’s license, which permits a resident to import, export, or sell freshwater fish or frogs, including live bait, shall be \$40.00.

3. The fee for a non-resident commercial fishing license, which permits a non-resident to take freshwater fish or frogs by any lawful method prescribed by the Commission and to sell such fish and frogs, shall be \$100.00.
4. The fee for a non-resident retail fish dealer's license, which permits a non-resident to sell freshwater fish or frogs to a consumer, shall be \$100.00.
5. The fee for a non-resident wholesale fish dealer's license, which permits a non-resident to sell freshwater fish or frogs within the state, and to buy freshwater fish or frogs for resale, shall be \$500.00.
6. The fee for a non-resident wholesale fish buyer's license, which permits a non-resident who does not sell freshwater fish or frogs in Florida to buy freshwater fish or frogs from resident fish dealers for resale outside the state, shall be \$50.00.

b. Estimates of direct harvest

1. Adult Eels

The highest reported harvest on record was in 1980-81 and totaled 460,000 lbs (208,652 kg). Since the early 1990's, however, American eel landings have experienced a substantial decline (Figure 1). Reported landings since 2000, when the first permitting system was established, have remained low, ranging from 1,248 lb (566 kg) to 25,601 lb (11,612 kg) (Table 1). The vast majority of the reported eels harvested has been taken by eel pot, and a small portion of harvest has been taken as by-catch from hoop nets and pound nets from the St. Johns River.

Ex-vessel value of the reported American eel harvest ranged from \$4,978 to \$62,978 between 2001 and 2012 (Table 1). Applying Florida's most current economic indicator (2.15), the total values of this harvest were estimated and ranged from \$10,708

to \$135,404 during this period. The highest value on record was reported in 1989 when the value of the harvest was estimated at \$546,000.

2. Yellow-stage American Eels

Yellow-stage American eels were collected from the St. Johns River commercial eel pot harvest from January through March of 2002 (N=507) and 2003 (N=458), January through February of 2004 (N=273), November 2004 through February 2005 (N=415), and December 2005 through January 2006 (N=249). The St. John's River system is large, measuring approximately 500 km in length (Figure 2). As a result, when comparing the size structure of harvested eels, length-frequency distributions were constructed for each section of river, which were arbitrarily designated as lower (north of the town of Palatka), middle (extending from Palatka to Lake Monroe), and upper (south of Lake Monroe) (Figure 2). Eels were obtained from the lower river in 2003-2005, from the middle river in 2002 and 2006, and from the upper river in all years. The length-frequency distribution did not differ significantly between eels measured live and those measured dead in 2005 (Kolmogorov-Smirnov 2-sample test; $KSa=0.454$; $P=0.986$), so all data were combined for each year by area. No eels in the samples collected were less than 300 mm in any year (likely due to trap mesh size), and they rarely exceeded 640 mm (Figures 3 to 5). The size structure of fish subsampled from the St. John's River commercial harvest has varied across years even within the same area (Table 2; Figures 3 to 5). These temporal differences may have resulted from various factors including changes in fish movement, fishing or sampling methods, and/or actual shifts in the size distribution of fish inhabiting these areas. However, in all years and areas, the commercial harvest has been dominated by fish ≥ 40 cm TL, which represented 70-96%

of the catch in a given year and area (Table 2). Also, eels captured in the upper portion of the river were generally larger than those captured in the lower river. Despite differences among years in size structure, the length-weight regression equations for yellow eels were nearly identical in all years, and all models explained a large portion of the variability ($R^2 = 0.88 - 0.94$; Table 4). This indicates that the condition of these eels did not experience significant shifts during the five-year period from 2002 to 2006.

Based on visual examination of the gonads, the sex ratio for all eels from the commercial harvest was 1 male to 4.7 females in 2002 and 1 male to 9.9 females in 2003. Visual examination of the gonads to determine sex for American eels has been shown to be problematic (Dolan and Power 1976). Therefore, sex should be determined from histological samples only, provided that adequate funds are available. Despite potential problems with the visual method, the harvested population is likely disproportionately female as approximately 70-96% of the eels harvested from the St. Johns River from 2002 to 2006 were at least 400 mm total length (Table 2). Published studies in other states have suggested that most eels above this 400 mm threshold are predominantly female (e.g., Harrell and Loyacano Jr. 1980). Furthermore, sex is believed to be primarily determined by environmental factors, such as density (Davey and Jellyman 2005). It has been found that the sex ratio of eels in upstream waters may be skewed toward female individuals due to lower density of eels in these habitats (Davey and Jellyman 2005). In 2004, seven histological samples were obtained to determine sex. These individuals ranged in size from 388 mm to 448 mm TL and all were determined to be female. In 2005, gonad samples for all collected yellow eels were preserved, histologically processed and examined for sex. A total of 326 gonad samples were

obtained from fish ranging in size from 305 to 663 mm TL. All of these individuals were deemed female, except for one male, which was 320 mm TL. These data indicate that the commercial eel pot fishery is almost entirely directed at the harvest of females.

In 2006, the swim bladders were examined for parasites in harvested individuals sacrificed for processing. The presence or absence of swim-bladder parasites was noted, and samples were preserved for future identification. A total of 117 and 79 eels harvested from the middle and upper St. Johns River, respectively, were examined. Of these, 33% and 11% of eels, respectively, showed visual signs of parasitic infection. Several of these parasites were preserved and later identified as a swim-bladder nematode in the genus *Anguillicola*. Although the species was not identified, it is possible that this species is the exotic swim-bladder nematode, *Anguillicola crassus*, which has been documented in other Atlantic coastal states in recent years. Additional samples of these nematodes will be preserved in the future so that multiple life stages can be examined and a positive species identification made.

3. Glass, Silver or Bait-sized Juvenile Eels

In most years, no commercial harvest of the glass eel stage, silver (mature) eel stage, or bait-sized juvenile eels has been reported. Generally, less than 5% of eels reported harvested were sold for use as bait, and these individuals tended to be small (i.e., less than 30 cm in length) (Table 3). These individuals were generally not targeted but were caught incidentally in eel pots and then sold to local bait and tackle shops. However, in some years, bait eels comprised up to 20 % of the commercial eel harvest (Table 3). Silver eels have been reported in 2008, 2009, 2011, and 2012 but they comprised no more than 7 % of the total harvest.

4. Consumption of Harvested Eels

The estimated percent of commercially harvested eels for human consumption was at least 80% in all years (Table 3).

c. Estimates of Export:

The amount of eels exported out-of-state was variable among years, with periods of low export ($\leq 38\%$; 2005-2008, 2010-2012) and periods of high export ($\geq 77\%$; 2000-2004, 2009) out-of-state (Table 3).

d. Harvest Data by Catch-Per-Unit-of-Effort (CPUE):

Data on adult eels were collected from commercial fish houses, permitted harvesters, and known non-permitted harvesters. Prior to 2004, CPUE and effort data for individual commercial fishers were not available. Catch rate was calculated by dividing pounds of fish harvested by the number of pots and soak time (in days) of each pot. Prior to the implementation of the trip ticket monitoring system in 2006, this number was estimated for each month and harvester, and then averaged. Beginning in 2006, catch per unit effort was calculated for each trip and then averaged. No zero catches (i.e., when harvesters retrieved traps with no fish) were reported during this period, so these estimates include only non-zero trip values. Mean CPUE has ranged from 0.33 ± 0.24 to 0.92 ± 1.30 lb/ pot-day from 2004 through 2012, with an overall average of 0.56 lb/ pot-day (Figure 6).

e. Permitted catch for personal use:

No permits were issued.

f. Permits issued for collection of the glass eel stage:

Collection of glass eels by dip net is allowed by rule. No experimental permits were issued for collection of glass eels using other gear types.

2. Recreational Fishery

Currently there is no known recreational fishery for American eel in Florida. FWC gear construction requirements for commercial eel pots 1" x ½" (25.4 mm x 12.7 mm) mesh, prevents harvest of eels less than 11 in (280 mm) using eel pots. This minimum length value is supported by data reported by Hale et al. (1982 and 1983) and Crumpton (2000 and 2001). Although some are occasionally caught, there is no directed hook-and-line effort for American eels in Florida. Some eel hook-and-line by-catch is occasionally used as bait for catfishing and in personal crab pots. Biologists who collect creel census information across Florida have indicated that the majority of eels caught as by-catch are released live. The American Eel Management Board has exempted Florida from establishing recreational minimum lengths and bag limits until it is evident that a fishery exists. The FWC requests that this exemption remain in force during 2012-2013.

3. Fishery Independent Monitoring

a. Annual Young-of-Year and Juvenile Survey

Methods

1. Guana River Dam

Eels were collected by dip net at the Guana River Dam near St. Augustine, Florida, four nights per week during the sampling period from 2002 to 2012 and once per week during the sampling period in 2001. Sampling occurred in February through March in 2002, from January through March in 2003 and 2004, and in January and February

since 2005. Dip nets were 20 in x 15 in (50.8 cm x 38.1 cm) with a nylon net bag of 1/32-in (0.79-mm) mesh and 8 in (20.3 cm) deep. The aluminum and fiberglass handle was 10 ft (3 m) long with the capability of extending to 18 ft (5.5 m). Dips were made every half hour on nighttime incoming tides. Generally, two dip-net sweeps were made near both side walls of the downstream side of the spillway. Date, average flow (m/s), time, water temperature (°C), number of dips, and number of eels per dip (CPUE) were recorded. Conductivity (mS/cm) and salinity (ppt) were also measured beginning in 2002. Prior to 2002, most eels were euthanized in a 10% formalin solution and weighed (g), and measured (mm) at the Eustis Fishery Research Laboratory. For all other years, except 2012, no more than 60 glass eels from each sample event were kept and preserved in formalin. In 2012, all glass eels were donated for a University of Rostock (Germany) genetic study, so these eels were preserved in 95% ethanol, per the study's protocol. Any juvenile pigmented eel collected was also preserved in formalin for measurement in all years.

Due to the presence of glass, i.e., non-pigmented, speckled worm eels *Myrophis punctatus* in the 2006 samples at Guana River Dam, length-frequency and length-weight relationships were compared between this species and American eel. A Kolmogorov-Smirnov test was used to compare the length frequency distributions, and an analysis of covariance (ANCOVA) was used to determine if the length-weight relationships differed between the two species. Based on these results and the re-examination of archived eel samples, catch and length data collected prior to 2006, which were often combined for both species, were corrected. The corrected values and analyses are provided herein.

Since 2006, all eels have been positively identified by examining individuals under a microscope, to ensure that only American eels are reported and included in analyses.

Several analyses were conducted to investigate the relationship between the catch rate of glass American eels and environmental variables, as well as temporal trends in size structure, fish condition and peak catch rate. To assess the relationship between catch rate and water temperature, salinity and flow, a Spearman rank-order correlation was performed using an alpha value of 0.05. For size structure, mean length of glass eels was compared through time using an analysis of variance (ANOVA) with an alpha level of 0.05. All test assumptions were checked prior to conducting the analyses, and if the year effect was significant, the means were separated out using the LSMEANS procedure (SAS 2000). The temporal trend in fish condition, as indexed by length-specific weight, was also assessed for glass eels by comparing the length-weight regression models for each year.

Because glass eels are preserved prior to processing, each year from 2009 through 2012, a subsample of eels was measured live and again after preservation to obtain an average change in length and weight values resulting from preservation. Live glass eels were immersed in tricaine methanesulfonate (MS222) within 12 hours of collection. Once immobile, eels were blotted dry, then measured to the nearest mm and weighed to the nearest 0.001g. Each glass eel was then preserved individually in 10% formalin (2009 to 2011) or 95% ethanol (2012) in a numbered vial. At least one month after preservation, the eels were again blotted dry and measured and weighed as before. We compared the two groups (live vs preserved) for each treatment (formalin and ethanol preservation) using a paired t-test for both weight and length, and compared the length-

weight regressions using an analysis of covariance (ANCOVA). We also estimated the magnitude of change in length and weight values due to preservation, so that data can be adjusted in the future to allow for comparisons with data from other states which typically only have live weight and length values.

2. Rodman Dam

Juvenile pigmented eels were sampled by lift net at Rodman Dam near Palatka, Florida, from February through March in 2001, 2002 and 2004. Sampling did not occur in other years, because additional areas and/or gears were explored for collecting glass eels. The 3-ft x 3-ft (0.9-m x 0.9-m) frames of the lift nets were constructed of 1/4-in (6.3-mm) steel rod, and were covered with 1/32-in (0.79-mm) nylon mesh. Nylon cord [1/8-in diameter x 3 ft long (3.2-mm x 0.9-m)] was attached to the corners of the frame and tied to a swivel so they were of equal length. A woven 3/8-in (9.5-mm) nylon rope 40 ft (12.2 m) long was attached to the swivel. Generally, ten lifts were made on each wing of the dam on its downstream side. For each sample, a lift net was lowered to the bottom along the dam wall, allowed to sit for five minutes, and retrieved. Date, time, water temperature (°C), and number of eels per lift (CPUE) were recorded. Conductivity (mS/cm) or salinity (ppt) was also measured and recorded in all years except 2001. Dam discharge (cfs) data were obtained for each sample day from the U.S. Geological Survey. Collected eels were preserved, then weighed and measured at the Eustis Fisheries Research Laboratory.

Due to low sample size and the lack of routine collections through time, data analyses were limited for juveniles collected at Rodman Dam. The relationship between measured environmental parameters and catch rate was assessed using the same

procedure as described above for glass eels collected at Guana River Dam. Due to low sample size in 2002, length-frequency distributions and length-weight regressions were only compared between 2001 and 2004. Length-frequency distributions were compared using a Kolmogorov-Smirnov test, whereas the length-weight regressions were compared using an analysis of covariance (ANCOVA), both with an alpha value of 0.05.

Results and Discussion

1. Guana River Dam

From 2002 to 2012, a total of 1,164 to 1,618 dips were made each year during 24 to 36 sampling events. For all years combined, water temperature, salinity, and discharge typically ranged between 11 and 20°C (10th and 90th percentile), 10 and 32 ppt, and 0 and 0.24 m/s, respectively, but conditions varied among years (Table 5). Salinity was driven, at least in part, by fresh-water releases from the dam. For example, salinity generally decreased through the time series in 2003 and 2004, which corresponded to the highest water flow rates measured in those years. Likewise, an increasing trend in salinity was observed in 2002, which likely resulted from a reduction in the amount of fresh water pulse releases from Guana River in the latter part of the time series. All three variables - water temperature, salinity, and flow - were significantly related to mean daily catch rate of glass American eels in some years ($P < 0.05$; Table 6). With all years combined, salinity and flow showed consistent statistical significance, but each typically explains less than 50% of the variability in catch rate (Table 6). The low variability explained suggests that other factors are playing a role in driving the migration of this species, although low flow tends to result in greater catches at this location.

Between 2001 and 2011, glass eels were captured at a maximum average daily rate ranging from 0.7 to 21.3 eels/dip (Table 7). In most years, a single peak in catch rate was observed, but a smaller secondary peak was also observed in some years, especially those with relatively high catches (e.g., 2001). The dominant peak typically occurred in January when catches were low (≤ 3 fish/dip; e.g., 2006-2008) and was delayed in years with larger catches (> 4 fish/dip; e.g., 2001 and 2003) (Table 7). Catch rates declined through time during the sampling season in 2009, with no discernable peak, the only time such a trend was observed.

Between 164 and 1,217 glass eels were collected and measured each season from 2001 to 2012 (Table 7). Because eels collected in 2012 were processed differently (i.e., preserved in ethanol), those data are discussed separately. With all other years combined, total length ranged from 42 to 63 mm. All length-frequency distributions were unimodal with median values ranging from 50 to 53 mm (Figure 7B). A significant year effect was detected ($F_{10,6100}=55.43$; $P < 0.001$). Using the LSMEANS procedure in SAS (2000), mean total length was found to be greatest in 2001 ($t_1 = 6.512$ to 15.260 ; $P < 0.001$) and 2005 ($t_1=3.255$ to 13.053 ; $P \leq 0.001$), which were the two strongest migration years (i.e., had the highest peak catch rates) to date. Mean total length generally declined with decreasing catch rate (Table 7; Figure 8), which suggests that in years with strong migrations, glass eel populations are composed of proportionally higher numbers of larger individuals.

Fish condition, as indexed by length-specific weight, was also assessed for glass American eels each year. The length-weight regression models were similar among years, which suggest that condition has remained relatively constant for this life stage

throughout the monitoring period (Table 4). These models were highly significant, but the variability explained by the models varied widely, from 49% to 74%, during the time series.

Even though glass eels are generally preserved in formalin prior to being measured, this process results in an average change of only -1.4% in length values (range: -3.4 to 0 for individual size groups) and +0.4% in weight values (range: -2.8 to 2.6 for individual size groups) (Table 8; Figure 9). For ethanol-preserved fish, the average changes in length and weight were -2.3% (range: -3.3 to 0 for individual size groups) and -52.7% (range: -54.2 to -50.7 for individual size groups), respectively (Table 8; Figure 9). Preservation yielded significant changes in length and weight for both mediums (paired t-test; $t = -2.02$ to 43.45 ; $P < 0.05$; Table 8). Although the slopes of the length-weight regressions did not differ significantly, the intercepts did ($F_{1,1835} = 39.75$ for formalin and $F_{1,173} = 1167.83$ for ethanol; $P < 0.001$; Figure 9). Given that ethanol preservation resulted in a much more pronounced change in weight values (Table 8; Figure 9), formalin is the preferred medium whenever preservation is needed.

Pigmentation stage of glass American eels was recorded beginning in 2004 according to criteria established by Haro and Krueger (1988). In all years, no glass eels had a pigmentation stage higher than five and most were stage one (no pigmentation) ($\geq 60\%$) (Table 7). In 2005, there was a strong eel migration and an increasing trend in the proportion of stage-one individuals was observed with size. In all other years, including 2011, no relationship was evident between size of glass eel and pigmentation stage (Figure 7C).

2. Rodman Dam

Lift-net samples for pigmented juvenile American eels were taken along the east and west wings below the spillway at Rodman Dam on 9 nights between January 20 and March 18, 2000; 14 nights between January 2 and April 2, 2001; 15 nights between February 1 and March 25, 2002; and 16 nights between February 3 and March 28, 2004. No samples were collected at this site in 2003. Range and median values for salinity, water temperature, and discharge are provided in Table 5. Salinity remained relatively constant through time in all years with values no greater than 0.5 ppt, but temperature tended to increase during the sampling period in most years. Water discharge varied widely among years. Water discharge was relatively stable during 2001 and was lower than 2002 for most of the sampling season. However, the highest discharge rates for all years occurred during the latter part of the 2004 sampling season.

The CPUE for pigmented juvenile eels at Rodman Dam during 2002 and 2004 ranged from 0.00 to 0.65 eels/lift and from 0.00 to 3.50 eels/lift, respectively (Figure 10). Peak catch rates in these years were lower than those recorded during the same period in 2000 and 2001 (15.7 and 10.6 eels/lift, respectively) (Figure 10). Peak catch rates were observed in mid to late February in 2000 and 2001, but in other years, a clear peak was not evident (Figure 10). No relationship was observed between catch rate of eels and salinity, temperature or water discharge ($P > 0.05$). However, in some years, high discharge rates may have influenced eel behavior or distribution at this site and may have negatively impacted the efficiency of the lift nets to sample these eels. As with dip nets, the effectiveness of the gear was qualitatively measured in 2004. Due to water discharge, the sampling gear could not be deployed on the west side of the dam on March 12; however, the gear was rated good (score = 1) to fair (score = 2) for all other sampling

dates. The fair ratings were reported nearly 40% of the time, but this was not consistent with water discharge. Gear effectiveness appeared to be more related to where the water was discharged from the dam rather than the magnitude discharged.

Length-frequency distributions were constructed for juvenile eels collected at Rodman Dam in 2001, 2002 and 2004 (Figure 11). Eels ranged in size from 81 to 207 mm TL, 98 to 176 mm TL and 96 to 215 mm TL in each year, respectively. Due to low sample size in 2002, length-frequency distributions were only compared between 2001 and 2004. Using a Kolmogorov-Smirnov two-sample test, the two distributions were significantly different ($KSa = 2.22$; $P < 0.001$) with medians of 118 and 125 for 2001 and 2004, respectively. Thus, the size structure in 2004 shifted slightly towards larger individuals.

Condition was also compared among years for elvers collected at Rodman Dam. Again, due to low sample size concerns, only 2001 and 2004 data were included in this analysis. Length-specific weight was significantly higher in 2004 than 2001 ($F_{1,714} = 240.23$; $P < 0.001$; Table 4). Additional data are needed to identify what factors may be influencing the condition of juvenile eels in this system.

b. Other independent surveys:

None.

c. Projects planned for the future:

1. Additional surveys should be initiated for other areas of the State to determine the distribution, habitat preference, and population characteristics (e.g., growth, number) of American eels in Florida. Through collaborative efforts with the Florida Department of Environmental Protection, Guana Tolomato Matanzas

National Estuarine Research Reserve, and University of North Florida, funding will be available to explore another site location for sampling glass eels in January and February 2013.

2. Other gear types should be evaluated to determine suitability for sampling young eels in Florida's waterways, which tend to have low gradient and few flow obstructions, such as spillways or dams. Passive gear types, such as the Australian rope pot, which require less intensive sampling and are more cost-effective than the current active sampling approach, should be considered. Through the aforementioned collaboration, two additional gear types, the Australian rope pot and small-mesh fyke net, will be explored at an alternate location in 2013.

d. Recommendations:

1. Continue sampling for glass eels at the Guana River Dam during the first two months of 2013. Due to continued funding constraints, we suggest that sampling be limited to the minimum six week period, from January 6 to February 16, 2013.

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Table 1. Commercial harvest of American eels in Florida by calendar year (January 1 through December 31) from 1994 through 2012. Number of permits issued for the commercial harvest of eels (#permits) is also provided. Permits were issued on a fiscal year basis (July 1 through June 30; i.e., FY2001 is July 1, 2001 through June 30, 2002) prior to 2012 and on a calendar year basis (January 1 through December 31) thereafter.

Year	#permits	Harvest		Ex-vessel Value
		Lbs	Kg	
1994	*	47,545	21,611	\$106,980
1995	*	57,992	26,360	unavailable
1996	*	28,510	12,959	\$ 94,476
1997	*	17,317	7,871	\$ 56,701
1998	*	13,819	6,281	\$ 38,935
1999	*	17,533	7,970	\$ 41,787
2000	19	6,054	2,752	\$ 9,081
2001	28	14,218	6,463	\$ 35,545
2002	23	7,587	3,441	\$ 16,318
2003	29	8,486	3,849	\$ 14,910
2004	12	7,330	3,325	\$ 18,410
2005	8	3,913	1,775	\$ 8,744
2006	11	1,248	566	\$ 4,978
2007	17	7,379	3,347	\$ 18,049
2008	35	15,624	7,087	\$ 32,654
2009	23	6,824	3,095	\$ 15,627
2010	29	11,287	5,120	\$ 27,540
2011	30	25,601	11,612	\$ 62,978
2012	47	11,845	5,373	\$ 36,653

* A permitting system was not in place until 2000, so no permits were issued prior to that year.

Table 2. Size structure characteristics of the commercial yellow eel fishery of the St. Johns River. Variables include sample size (N), median total length of the sample (Median), minimum (Min) and maximum (Max) total length of the sample, and percent of sample that was at least 40 cm TL (≥ 40 cm), 50 cm TL (≥ 50 cm) and 60 cm TL (≥ 60 cm).

Area	Year	N	Median	Min	Max	≥ 40 cm	≥ 50 cm	≥ 60 cm
Lower	2003	240	46	31	62	78	30	< 1
	2004	148	52	36	75	96	57	15
	2005	237	49	33	70	88	44	9
Middle	2002	213	45	33	61	80	25	< 1
	2005	46	48	36	63	91	48	9
	2006	170	47	33	65	90	34	4
Upper	2002	294	45	32	69	72	32	9
	2003	218	43	30	66	70	25	2
	2004	125	43	33	65	70	18	2
	2005	132	45	30	63	80	27	2
	2006	79	46	32	64	86	37	13

Table 3. Market information for commercially-harvested American eels, based on reports provided by commercial eel harvesters. Information includes amount of eels sold for human consumption (% food) versus bait (% bait) and amount of eels sold to in-state markets (% in-state) versus out-of-state markets (% out-state) for each calendar year (January 1 – December 31).

Year	% food	% bait	% in-state	% out-state
2000	100	0	0	100
2001	100	0	0	100
2002	100	0	0	100
2003	100	0	23	77
2004	95	5	12	88
2005	100	0	88	12
2006	80	20	100	0
2007	99.9	0.1	62	38
2008	99	1	75	25
2009	100	0	22	78
2010	99.5	0.5	63	37
2011	86	14	70	30
2012	90	10	97	3

Table 4. Length-weight regressions for yellow, glass and pigmented juvenile American eels collected from the St. John's River commercial fishery, Guana River Dam and Rodman Dam, respectively. LogWt refers to the \log_{10} (weight in grams) value and LogTL refers to the \log_{10} (total length in mm) value.

Eel Stage	Year	Equation	R ²	P-value	Sample Size
Yellow	2002	LogWt = -6.0805 + 3.1372*(LogTL)	0.88	<0.001	507
	2003	LogWt = -5.8081 + 3.0278*(LogTL)	0.89	<0.001	458
	2004	LogWt = -5.9637 + 3.0880*(LogTL)	0.91	<0.001	273
	2005	LogWt = -6.2298 + 3.1855*(LogTL)	0.94	<0.001	238
	2006	LogWt = -6.0858 + 3.1324*(LogTL)	0.93	<0.001	196
Glass	2001	LogWt = -5.8553 + 2.8617*(LogTL)	0.55	<0.001	849
	2002	LogWt = -5.8890 + 2.8862*(LogTL)	0.54	<0.001	507
	2003	LogWt = -5.6649 + 2.7571*(LogTL)	0.64	<0.001	624
	2004	LogWt = -6.0466 + 2.9756*(LogTL)	0.67	<0.001	261
	2005	LogWt = -6.7960 + 3.4153*(LogTL)	0.74	<0.001	1217
	2006	LogWt = -6.1753 + 3.0347*(LogTL)	0.62	<0.001	265
	2007	LogWt = -5.8686 + 2.8358*(LogTL)	0.57	<0.001	366
	2008	LogWt = -5.9947 + 2.9842*(LogTL)	0.61	<0.001	379
	2009	LogWt = -6.4095 + 3.1609*(LogTL)	0.57	<0.001	596
	2010	LogWt = -5.9916 + 2.9325*(LogTL)	0.49	<0.001	697
	2011	LogWt = -6.6644 + 3.3075*(LogTL)	0.52	<0.001	349
	2012*	LogWt = -7.0072 + 3.3229*(LogTL)	0.72	<0.001	164
Juvenile	2001	LogWt = -5.9379 + 2.9764*(LogTL)	0.84	<0.001	537
	2004	LogWt = -6.0460 + 3.0714*(LogTL)	0.95	<0.001	180

* Glass eels collected in 2012 were preserved in 95% ethanol, as compared to 10% formalin in all other years.

Table 5. Summary statistics for environmental parameters measured at Guana River and Rodman Dams from 2001 through 2012. Minimum (Min), maximum (Max), and median (Med) values are provided for water temperature (°C), salinity (ppt), flow (m/s for Guana), and discharge (cfs for Rodman). NA indicates that data were not available.

Site	Year	Period	# Events	Temp			Sal			Flow/Discharge		
				Min	Max	Med	Min	Max	Med	Min	Max	Med
Guana	2001	1/2 - 4/2	12	7	25	20	NA	NA	NA	0	1.50	0.05
	2002	2/1 - 3/28	31	13	25	18	8	27	17	0	1.87	0
	2003	1/17 - 3/21	32	8	25	16	1	28	15	0	1.33	0
	2004	1/5 - 2/27	32	10	20	14	13	28	19	0	0.15	0
	2005	1/2 - 2/28	33	9	21	15	10	20	14	0.06	0.47	0.15
	2006	1/2 - 2/22	31	9	20	16	7	19	11	0.02	0.30	0.16
	2007	1/2 - 2/28	33	12	22	16	26	32	29	0.02	0.26	0.15
	2008	12/30-2/28	29	7	21	15	9	22	17	0.01	0.46	0.04
	2009	1/4 - 2/26	32	8	20	15	18	31	22	0.01	0.22	0.07
	2010	1/4-2/12	24	3	17	13	11	25	16	0.01	0.48	0.14
	2011	1/2-2/22	30	7	22	14	32	40	35	0.01	0.22	0.01
	2012	1/2-3/8	36	9	23	18	24	31	27	0.01	0.13	0.04
Rodman	2001	1/2 - 4/2	14	9	23	15.5	NA	NA	NA	353	639	560
	2002	2/1 - 3/25	15	13	25	19	0	0.5	0.4	414	1080	846
	2004	2/3 - 3/28	16	14	21	18	NA	NA	NA	779	1950	1300

Table 6. Results for the Spearman-rank correlation analyses between environmental parameters and mean catch rate of glass eels at Guana River Dam. Dashes (---) indicate that the relationship was not significant and an asterisk (*) indicates the relationship was only significant at an alpha value of 0.10.

Year	Spearman Correlation	Temp	Salinity	Flow
2002	r	-0.480	---	---
	P-value	0.006	---	---
	N	31	---	---
2003	r	-0.667	0.369	-0.361
	P-value	<0.001	0.038	0.050
	N	32	32	30
2004	r	---	0.512	-0.438
	P-value	---	0.003	0.014
	N	---	32	31
2005	r	---	0.467	-0.325*
	P-value	---	0.006	0.065
	N	---	33	33
2006	r	0.367	0.589	-0.661
	P-value	0.043	<0.001	<0.001
	N	31	31	30
2007	r	---	---	-0.534
	P-value	---	---	0.002
	N	---	---	32
2008	r	---	0.493	-0.345*
	P-value	---	0.007	0.067
	N	---	29	29
2009	r	---	0.521	-0.568
	P-value	---	0.003	0.001
	N	---	31	31
2010	r	0.7435	0.4577	---
	P-value	<0.001	0.028	---
	N	24	23	---
2011	r	---	0.5523	-0.8071
	P-value	---	0.002	<0.001
	N	---	28	30
2012	r	-0.577	---	---
	P-value	<0.001	---	---
	N	36	---	---

Table 7. Average glass eel catch rate across all sampling dates (Avg CPE; fish/dip) and Timing and magnitude of peak catch rates (Peak CPE; fish/dip) of glass eels collected at Guana River Dam from 2001 to 2012, mean total length (TL) for glass eels measured (N), and percentage of measured eels that had stage-1 pigmentation (% Stage 1). Dashes (---) indicate that a peak was not observed or eels were not staged and an asterisk (*) indicates that eels were preserved in ethanol instead of formalin.

Year	Avg CPE	Peak CPE	Date of Peak CPE	Mean TL (mm)	# Measured	% Stage 1
2001	3.57	21.25	February 15	52.8	849	---
2002	0.56	3.32	February 15	50.4	507	---
2003	1.53	12.19	February 11	51.7	624	---
2004	0.17	1.02	January 26	50.6	261	81
2005	3.10	15.96	January 22	52.0	1,217	70
2006	0.18	0.91	January 4	51.4	265	60
2007	0.27	1.90	January 22	51.0	366	78
2008	0.36	1.84	January 30	49.9	380	70
2009	0.41	---	---	51.0	596	80
2010	0.64	3.39	January 16	50.8	697	80
2011	0.54	3.13	January 6	50.9	349	78
2012	0.10	0.67	February 24	50.5*	164	97*

Table 8. Percent change in total length (TL; mm) and weight (WT; g) for fish measured after being preserved with 10% buffered formalin or 95% ethanol. Number of fish measured (N) is also provided.

TL (mm)	Formalin			Ethanol		
	%change TL	%change WT	N	%change TL	%change WT	N
45	0.0	1.6	1	0.0	-52.3	1
46	0.0	-0.1	2	-3.3	-53.2	2
47	-0.3	-2.8	8	-2.1	-53.3	1
48	-0.7	1.3	14	-1.6	-53.9	8
49	-2.1	2.4	31	-2.0	-54.0	7
50	-1.4	0.1	71	-2.4	-53.2	14
51	-1.6	-0.2	59	-2.9	-54.2	10
52	-1.9	1.1	73	-2.6	-53.3	14
53	-2.1	-0.8	40	-2.5	-51.6	6
54	-2.1	1.6	43	-2.3	-51.0	4
55	-1.9	1.6	36	-1.8	-51.1	9
56	-1.8	2.4	11	-2.1	-51.7	6
57	-1.9	-0.5	13	-2.6	-52.5	2
58	-1.7	-0.4	4	-1.7	-54.2	2
59	-3.4	2.6	1	-1.7	-50.7	1
60						
61	-1.6	-1.2	1	-3.3	-53.5	1
Total			408			88
Average	-1.4	0.4		-2.3	-52.7	

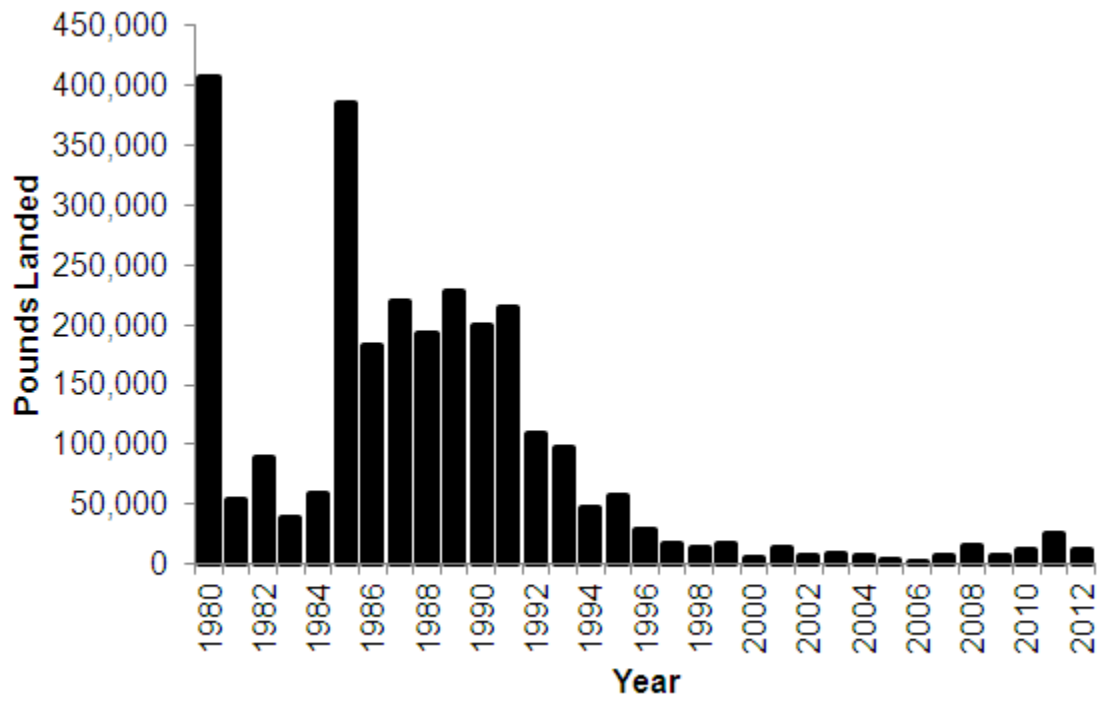


Figure 1. American eel commercial landings in Florida, 1980-2012.

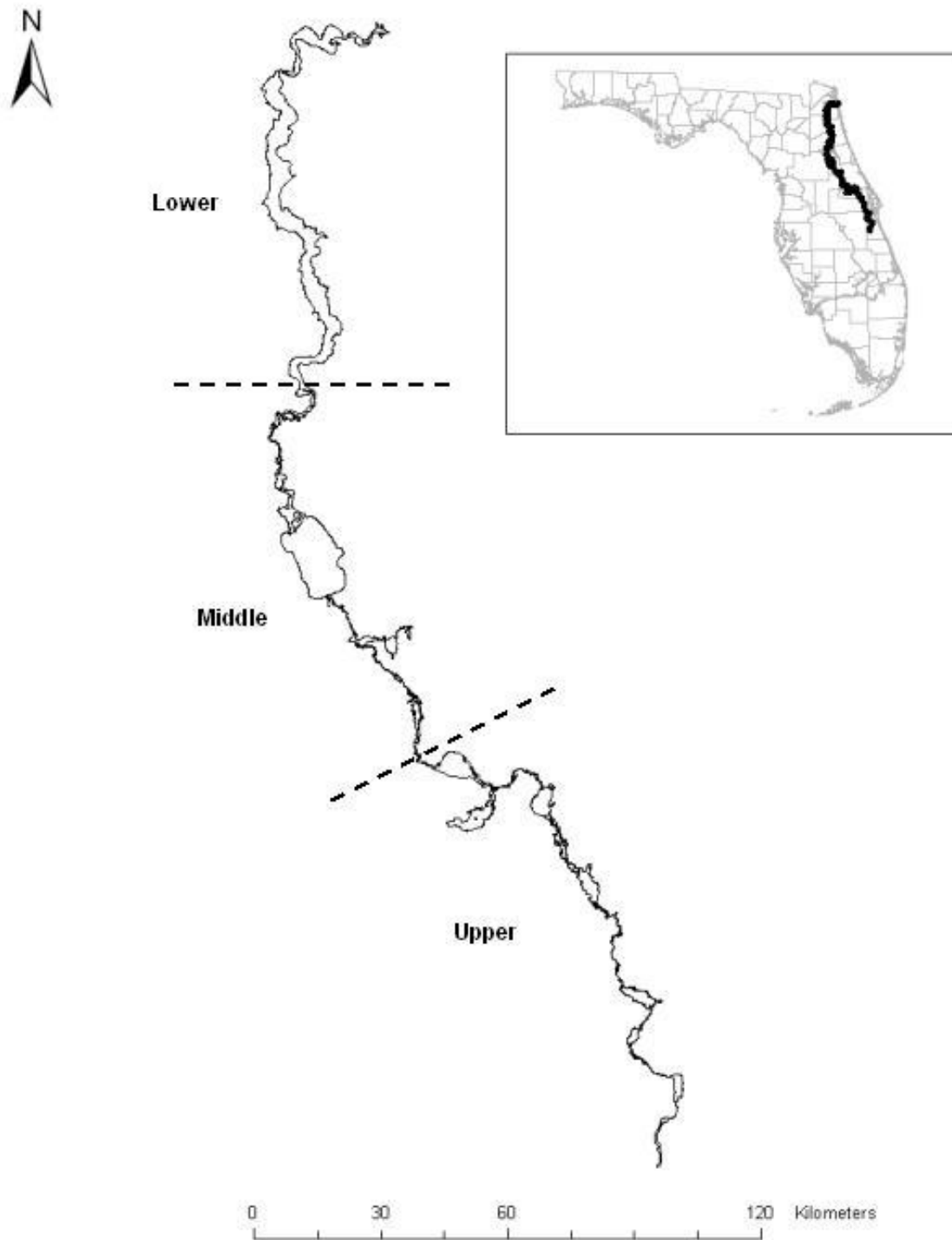


Figure 2. Map depicting the lower, middle, and upper regions of the St. Johns River, Florida.

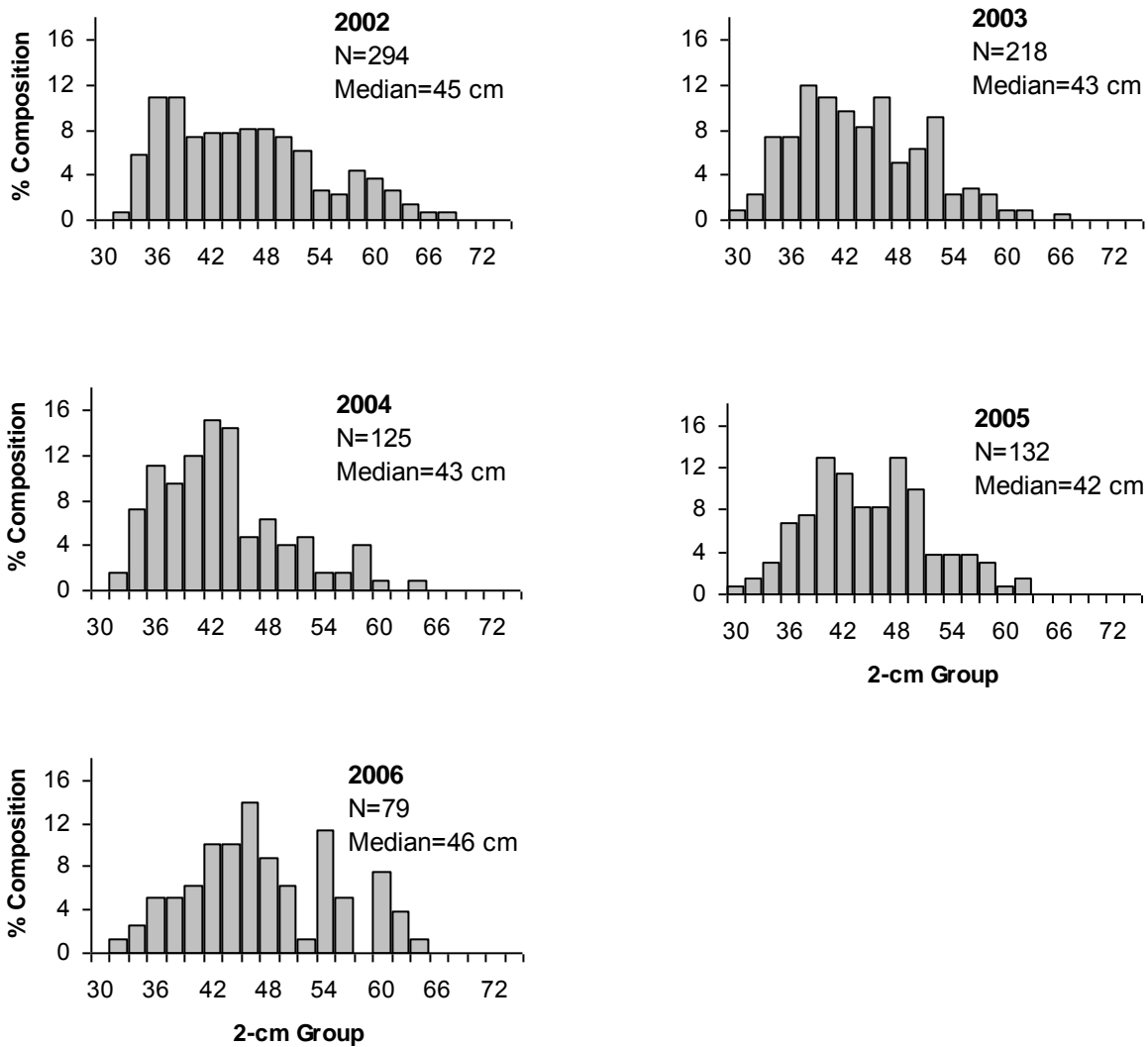


Figure 3. Length frequency of American eels collected from the upper St. Johns River, Florida by commercial eelers during the 2002 to 2006 harvest seasons.

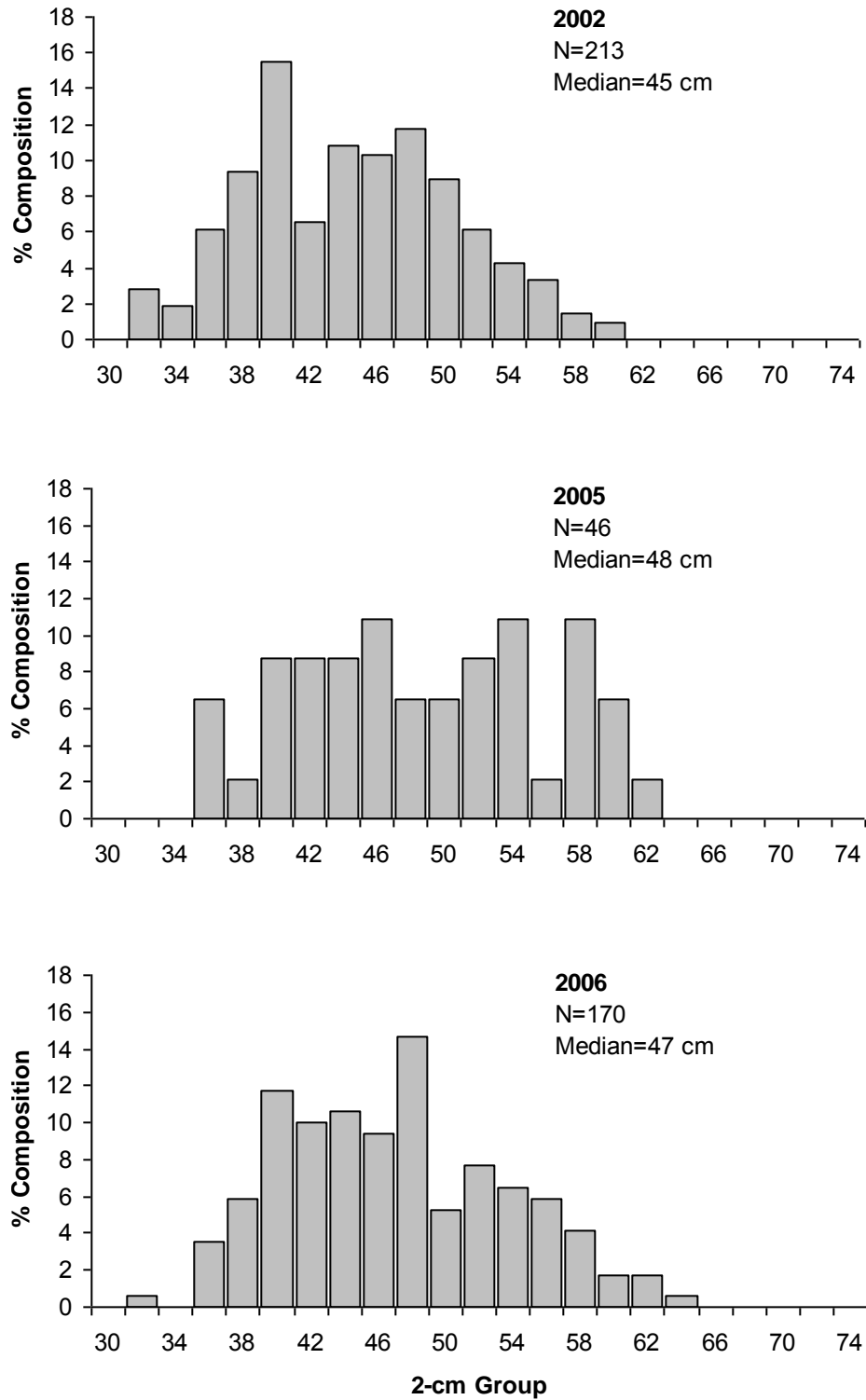


Figure 4. Length frequency of American eels collected from the middle St. Johns River, Florida, by commercial eelers during the 2002 to 2006 harvest seasons.

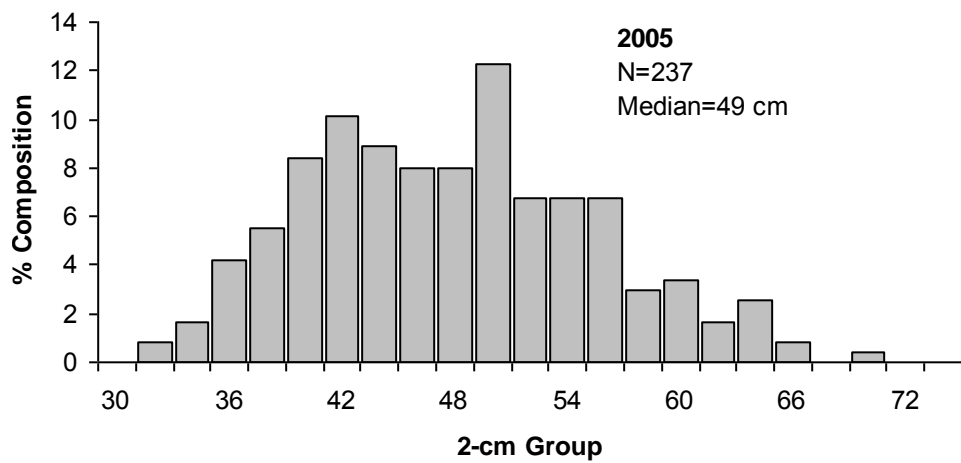
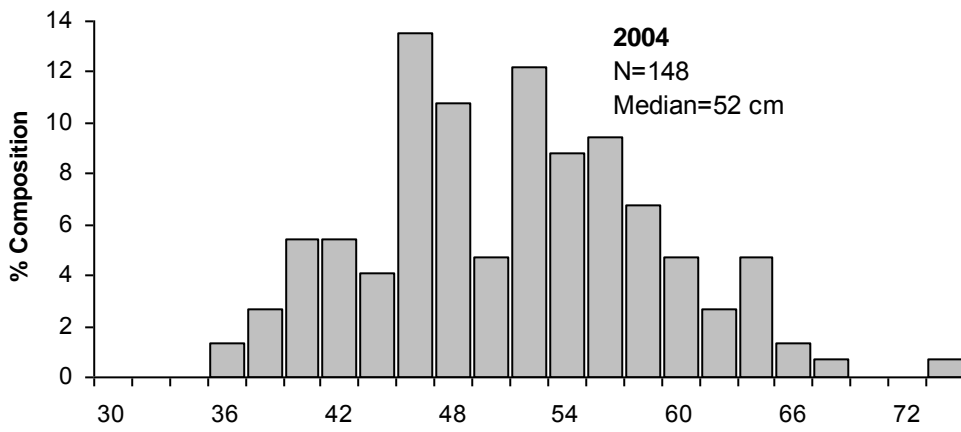
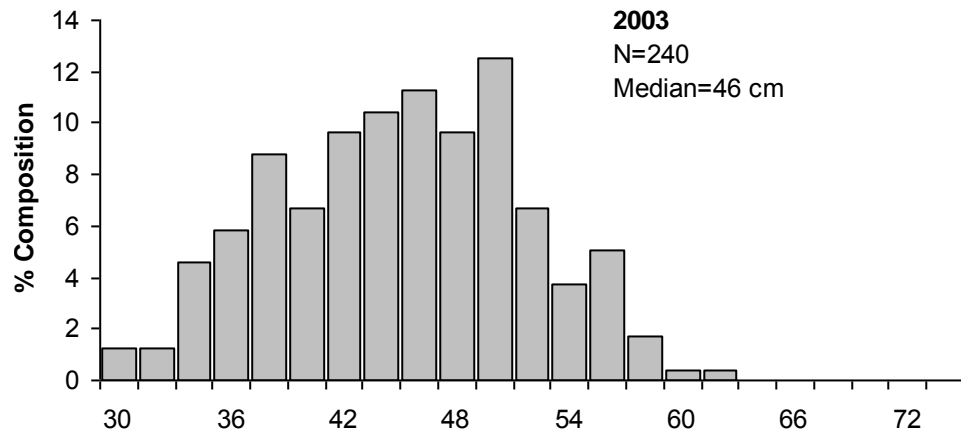


Figure 5. Length frequency of American eels collected from the lower St. Johns River, Florida, by commercial eelers during the 2003 to 2005 harvest seasons.

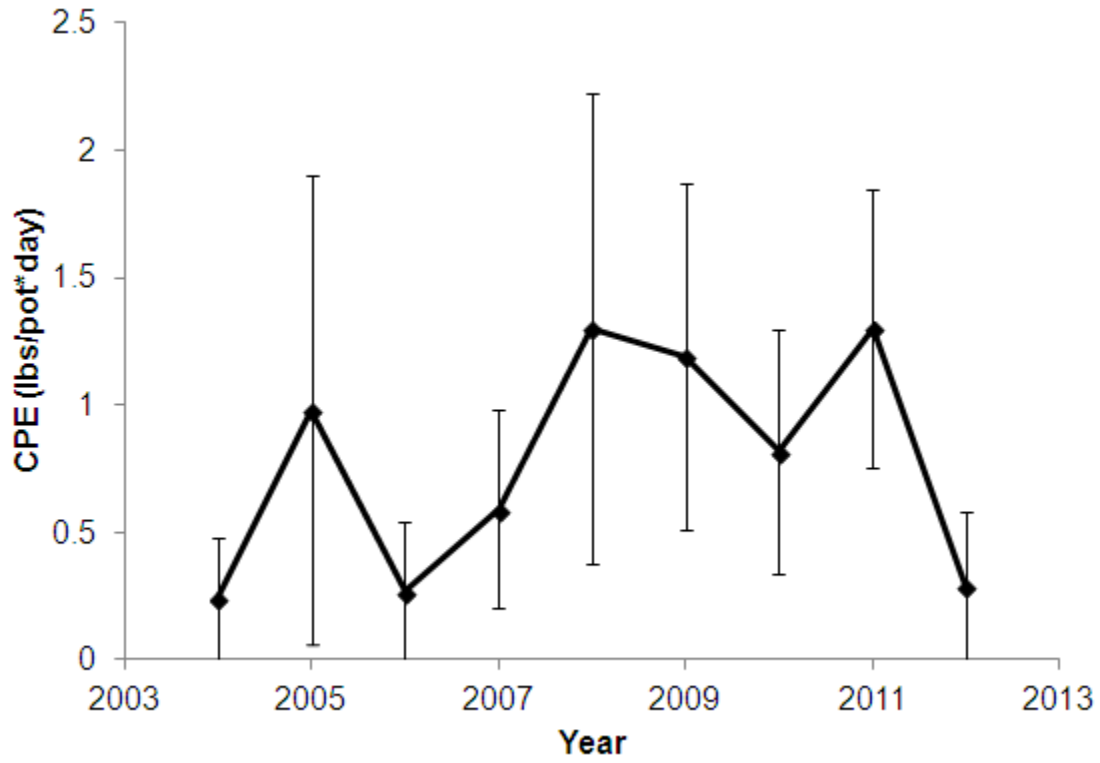


Figure 6. Annual mean and standard deviation for catch per unit effort (pounds of eel harvested per pot per day) from the commercial American eel fishery.

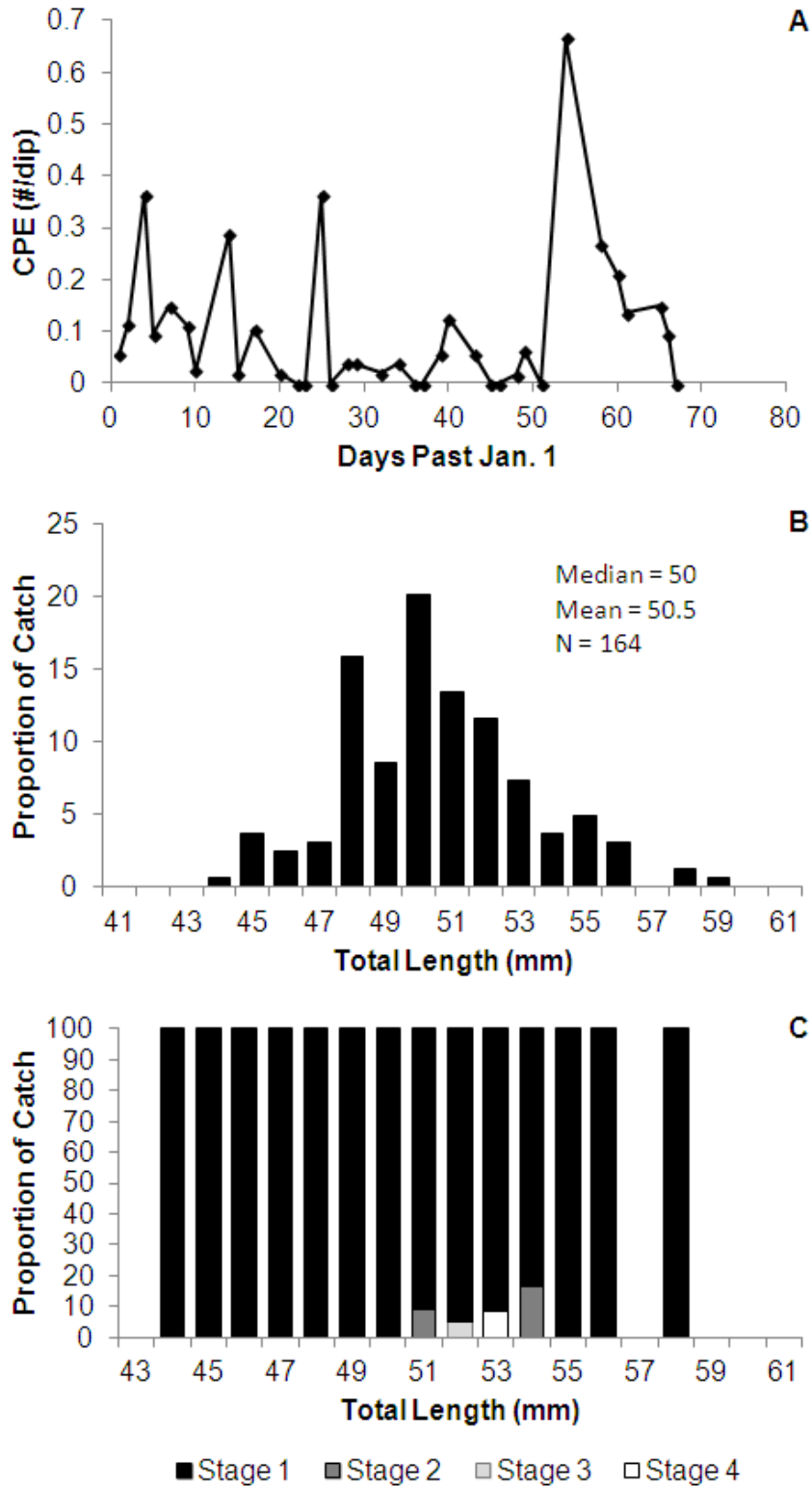


Figure 7. Daily catch rate (CPE; fish/min; A), length frequency distribution (B) and proportion of different pigmented stages (C) of glass American eels collected at Guana River Dam in 2012.

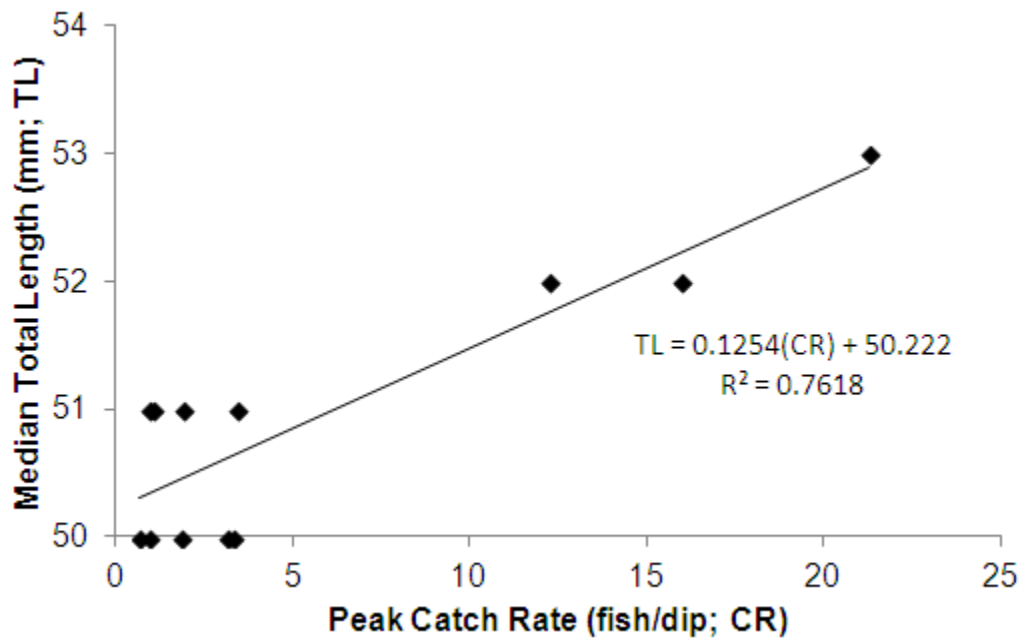


Figure 8. Relationship between annual peak catch rate (fish/dip) and median total length (mm) of glass eels collected at Guana River from 2001 to 2012.

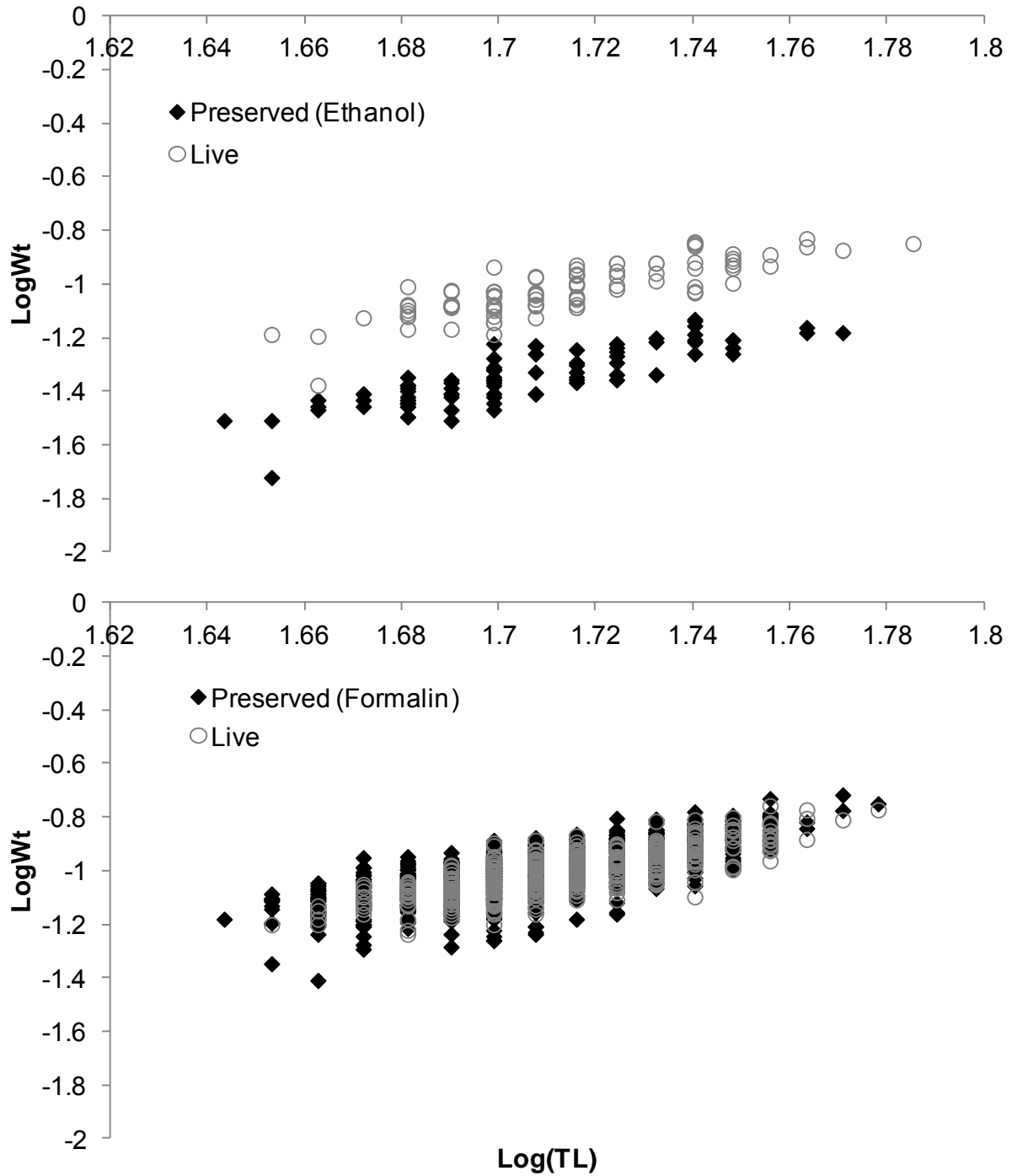


Figure 9. \log_{10} (total length; mm) and \log_{10} (weight; g) of glass eels measured live and following ethanol (top panel) or formalin (bottom panel) preservation. Eels were collected at Guana River Dam from 2009 to 2012.

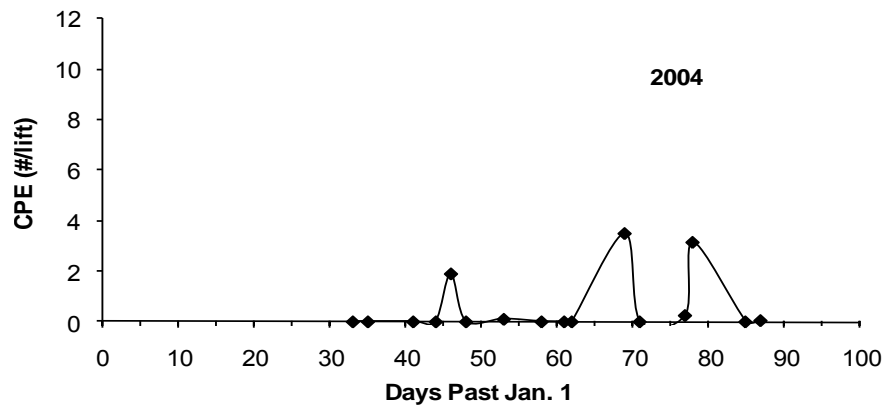
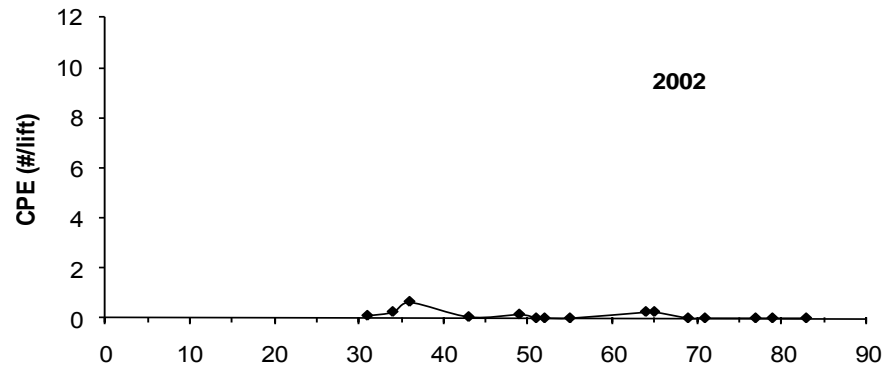
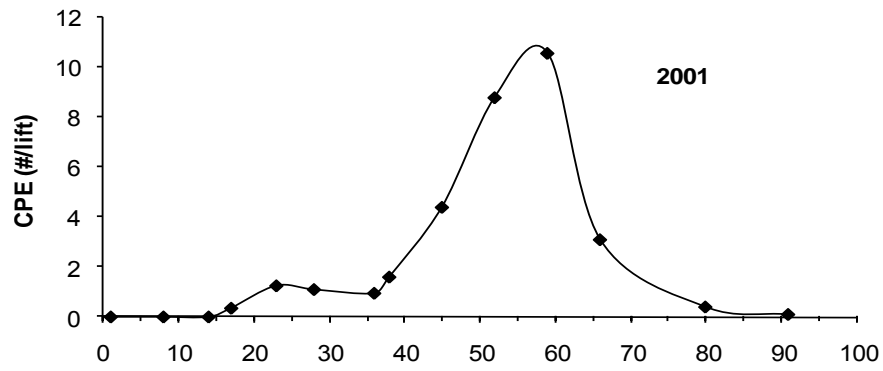


Figure 10. Catch rates of pigmented juvenile American eels collected at Rodman Reservoir Dam from 2001 to 2004.

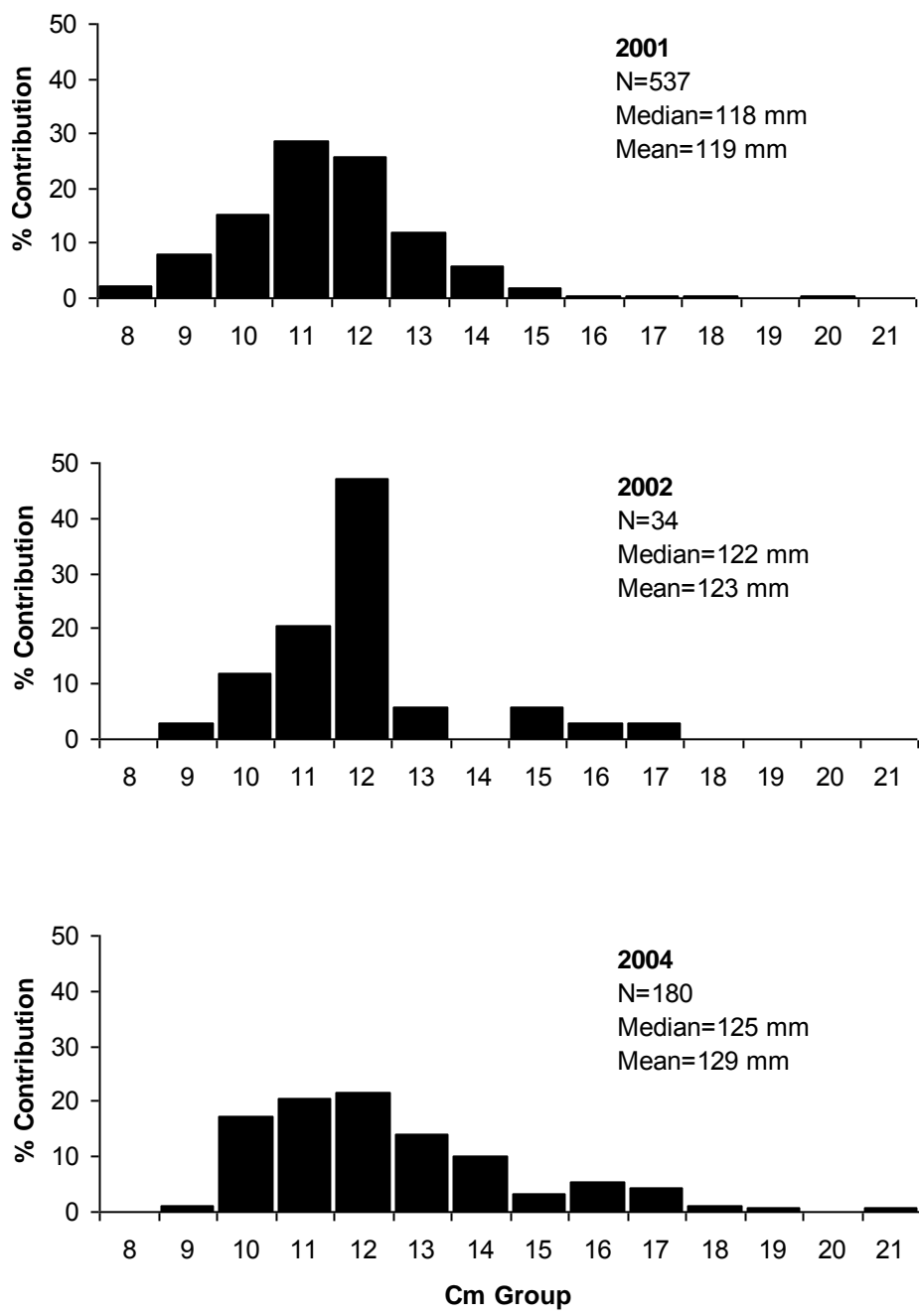


Figure 11. Length-frequency distributions of pigmented juvenile American eels collected at Rodman Reservoir Dam from January to April, 2001-2004.